

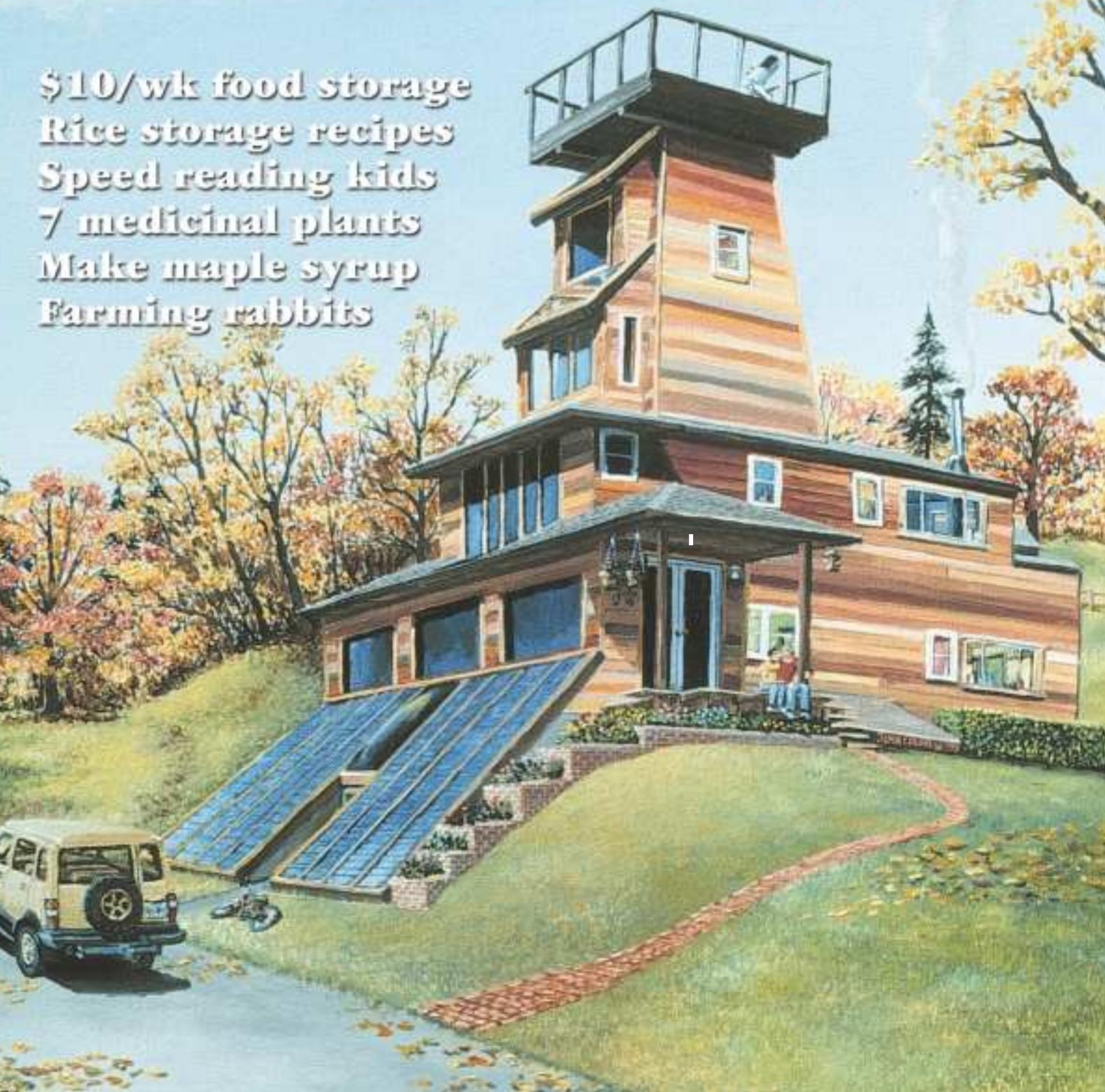
WIN A COMPLETE SET OF ORIGINAL ISSUES! PAGE 6

Backwoods Home magazine

practical ideas for self reliant living

\$10/wk food storage
Rice storage recipes
Speed reading kids
7 medicinal plants
Make maple syrup
Farming rabbits

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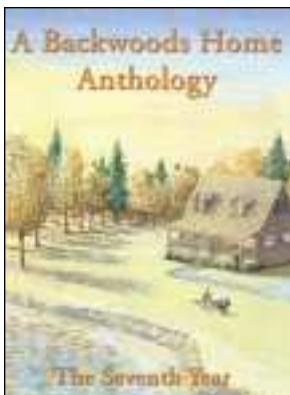
Publisher's Note

Win a complete set of original back issues

The winner of our first giveaway of a complete set of original back issues is the Dover Public Library in Dover, Ohio. We'll continue to draw names from among our three-year or longer subscribers for the next several issues and give the person whose name is drawn a set of the issues. The next drawing will be September 15. And to comply with one of the more screwed-up laws in this country, I must also add: No purchase necessary. While I'm at it, let me also add: All bureaucrats and politicians are morons.

7th year anthology

Our 7th year anthology will be coming off the press shortly. We've packaged it together with our other anthologies in an ad on page 3. You can buy it separately at the usual anthology price of \$16.95, which includes shipping.



Cover price change

The cover price of newsstand copies of the magazine has gone up to \$4.95 for the U.S., \$6.50 for Canada. The subscription price is unchanged. The newsstand price reflects the extra cost of doing business on the newsstand.

Water article and books pages

Michael Hackleman's "home water system" article, which began as a two-part article last issue, is now a three-part article with the second part appearing on page 70 of this issue. We broke the article up a bit more in response to some readers' complaints that it crowded out too many of the shorter articles we normally carry.

We also shrunk the books pages from 10 to 5 pages by cutting a few books and reducing the image size of others. This will also allow us to squeeze in more articles.

Who wants to sell anthologies?

The sale of our anthologies has been so successful for us that we thought we'd give all the mom and pop stores out there a chance to sell them. If you are interested, please call Ron Graham at (541) 247-8900.

Online columns by Duffy and Silveira

The *BHM* web site (www.backwoodshome.com) features a section that carries a lot of excellent political commentary columns written by good writers who have a sound grasp of the important issues of our time. Most of the columns would not be found in your local newspaper. John Silveira and I have been getting so mad lately at the direction the country seems to be going in that we decided to join this online group of columnists and begin writing about a column each week. If you're on the Internet, check them out.

Are we a survivalist magazine?

The other day Massad Ayoob, our gun columnist, told me he was testifying as an expert witness in court when the attorney questioning him waved a copy of *Backwoods Home Magazine* in his face and demanded he explain his association "with this survivalist magazine." Mas said he'll write a future column on it for us, probably for next issue.

I'm not sure what a survivalist magazine is, or if we are one or not. Survivalist has become one of those buzz words that the mass media has made sound ominous. But it's nice to be noticed anyway. The lawyer probably read some of the lawyer jokes on our Irreverent Jokes page, and got ticked.

Search for extraterrestrial life

Speaking of aliens, here at the *BHM* office we're looking for extraterrestrial intelligence. Employees are running a screensaver on their office and home computers that analyzes data from the world's biggest radio telescope at Arecibo, Puerto Rico. The screensaver looks for patterns in the random radio noise that permeates the universe. If patterns are found, they may be signs of intelligent life. On most of our office computers, the analysis is performed only when our computers are idle. But because our layout artist, Mark Cogan, has a very fast computer, he runs the analysis all day in the background.

We are only a few of more than 600,000 people in 205 countries participating in this effort. You can join us by visiting <http://setiathome.ssl.berkeley.edu/> and downloading the screensaver and the packets of information to be analyzed. There's a remote chance that your computer may be the first to find signs of an extraterrestrial civilization.

In the meantime, we have our new artist, John Dean, looking for signs of intelligent life around the office. We'll report on both searches in a future issue. Δ

My view

Should both drugs and guns be legal?

Answering the question of “Should drugs be legal?” is like answering the question of “Should guns be legal?” Whoever answers either question steps onto a minefield of passionate opposition—from conservatives if you say yes to drugs, and from liberals if you say yes to guns. That’s why it’s easier to recognize that both questions are really part of a much larger and more important question: Should government be controlled? And the answer to that question, as well as the other two, is yes.

The illegalization of drugs gives government the *excuse* to trample our rights, under the guise of protecting us and our children from their effects, and the illegalization of guns will give government the *ability* to totally trample our rights because we would have no defense against it.

What has the illegalization of drugs accomplished?

- Prisons are overcrowded with drug offenders sentenced under mandatory sentencing laws while violent offenders go free to make room. The result is the U.S. now has the highest incarceration rate in the world, made up mainly of people who have never committed a violent crime—pretty incredible for a “free” country.
- There is increased corruption in our police and judicial systems due to the large amount of money available for payoffs. The poorer you are the more likely you are to go to jail; monied drug lords with their high-priced lawyers have little to fear from the law.
- Millions of Americans who suffer from chronic pain go undermedicated because doctors are afraid to prescribe pain killers for fear of being investigated (a number have already been sent to prison) by a drug enforcement agency. A U.S. health agency has called the suffering of these patients a national disgrace.
- Seizure of property from citizens who have not been found guilty of any crime has gone sky-high, thanks to drug laws that give police the power to seize property *suspected* of being involved in a crime. It’s up to the owner to *prove* his property is innocent. Orwellian?
- The War on Drugs is a repeat of Prohibition in the ‘30s. The amount of drugs consumed in America has not gone down appreciably, but the price of them has gone way up, making them even more attractive to sell.

What will the illegalization of guns accomplish?

- This is the classic history lesson of our century. Like all the communist and fascist states that outlawed guns before turning against their own people, we will be powerless to resist our government should it turn against us. And judging from our government’s conduct in its War on Drugs, it already has.

What about the arguments against making drugs legal and keeping guns legal? Both are essentially the same: drugs and guns lead to the destruction of our children, the former through destroying their physical and mental well being and the latter through killing them outright.

Both arguments play on the public’s desire to protect their children at all costs. Those who would keep drugs illegal would imprison our children rather than have them take drugs, and those who would make guns illegal would expose our children to the potential enslavement of a government turned tyrannical rather than let them be endangered by guns. (Another story is the fact that Justice Department statistics show that guns are used by private citizens to prevent violent crimes far more often than they are used to commit crimes, but the stories behind those statistics never make it into the newspapers. I wonder why?)

People in government, especially the cadre of bureaucrats who think they know best how we should run our lives, find these excuses convenient to hide behind. The illegalization of drugs has given our government the excuse it needs to stop us on the street and make a warrantless search of our person, to invade our home on the suspicion we may be using drugs, and to send our children to prison for their own good. The illegalization of guns would allow the government to go even further because we would have no way to resist police in what appears to be our emerging police state.

I am the father of four children and here’s what I think of the government and their conservative and liberal supporters who want to protect my children against drugs and guns: Leave my children alone. They are my concern, not yours. I would rather they ran the risk of experimenting with drugs than have some government agent send them to prison to be gang raped by hard core criminals. And I would rather they risked being gunshot than have them live out their lives as servants to a tyrannical government without any chance to restore their freedom through armed resistance.

Drugs and guns may be bad if used badly, but an all powerful Government is much worse. The illegalization of drugs may have sounded like a good idea in theory once, but it has given Government far too much power over us. And the proposed illegalization of guns may sound like a good idea in theory to some because it is supposed to help keep our children safe, but in reality it will take away our last and ultimate defense against government. And like our Founding Fathers I would rather live free with some peril than live as the protected slave of government.

The question is this: Do we want a powerful government that can come into our homes or stop us on the street at will and arrest us on the suspicion we may be guilty of a crime, that can seize our property on the suspicion it is guilty, and that sends our children to prison for their own good? Or do we want a government that dares not trample on our rights guaranteed in our Constitution?

If the latter, then both drugs and guns must be legal. Δ

— Dave Duffy

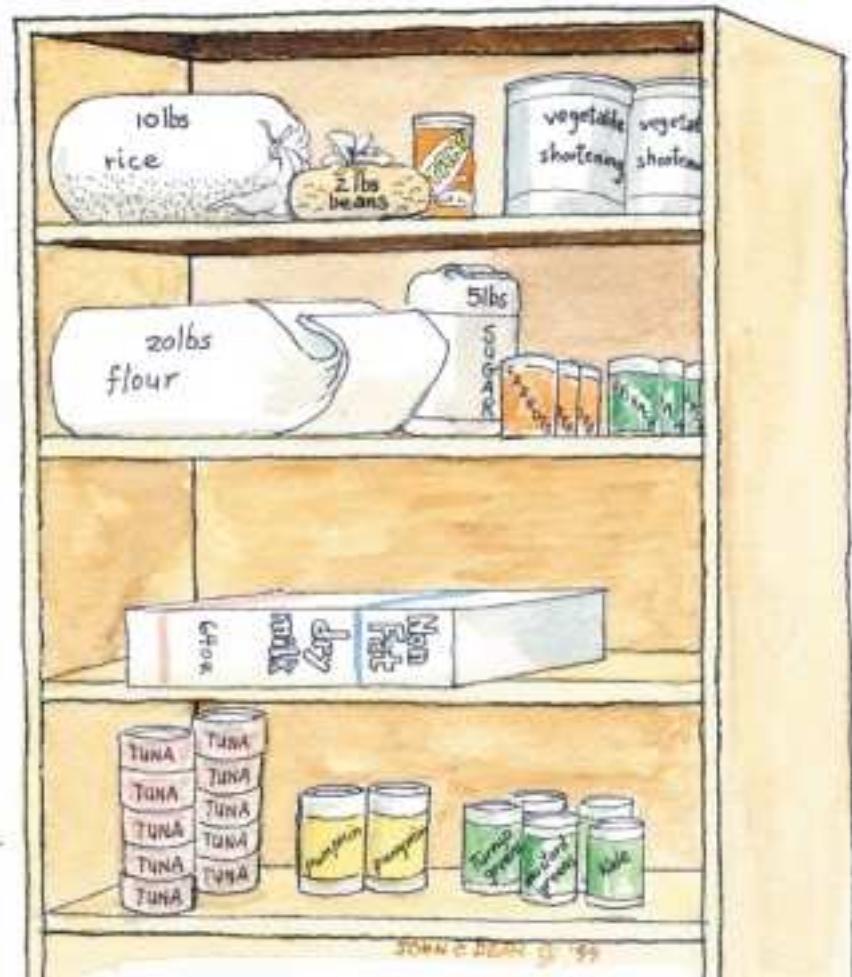
Start your food storage on \$10 a week

BY ALAN T. HAGAN

If Old Mother Hubbard had had a food storage program before she went to her cupboard her poor dog would have gotten his bone. Given the fact that her cupboard was bare it was probably because she didn't have the wherewithal to fill it. Finding the resources to put food by against troubled times is a common problem, but it is solvable, even for those of us on tight budgets. In fact, over the long term, the food storage program you start now will save you money. It is like starting a savings account. You earn interest through greater savings in your grocery budget.

Despite what many believe, you don't have to spend large amounts of money on specially packaged foods to put away a sizable food store. You certainly can do this if you like, but what you're doing is trading money (and a good deal of it) to save effort and time. Turn that equation around and you can save a lot of money if you're willing to spend a bit more time and effort to get what you want.

Depending on what you decide is important to you, everything you will need for a complete food storage program can be had from your local grocer and, perhaps, some other local businesses.



Preparing for what?

Before buying anything you should sit down at the kitchen table with paper and pencil because you have some decision making to do. Ideally, everyone who'll be depending on the food storage should be at the table as well, but the person who will be responsible for the program can do it alone, if necessary.

Your first decision to make is "what are you storing food for?" What situations and circumstances do you think might occur which would cause you to need your food stores and prevent you from easily being able to get more? Make a list of everything that occurs to you which you think has some significant probability of happening. Just jot them all down as they come to you

and then on another sheet reorder them according to how likely you think they are to occur. While you are doing this, make a note beside each one of whether or not you will have some means of cooking or preparing food should it come about. You'd really hate to have stored away hundreds of pounds of food only to find yourself with no way to make it into a meal. This process is called "scenario planning."

Once you have your list, write next to each scenario the length of time you feel it might last. Chances are, the situations that will concern you most are weather related and some of the more common man-made disasters, but may also cover long term unemployment, Y2K (the millennium computer bug), severe economic depression, war or civil insurrection, or threats even more exotic (cometary impacts, anyone?).

Now that you have a list of probable scenarios and the length of time you think each may last, you are ready to plot the course of your program. Plan your food purchases to meet the needs of the shortest duration scenarios on your list first. As you accomplish each goal set your sights on the next longest and work towards covering that one. In this way you are steadily preparing for one scenario after another while making progress towards your ultimate goal of meeting the needs of your longest lasting concerns.

How do I pay for it?

Right off the bat, I want to say where you should not get the money to pay for your food storage and that is by running up debt. This means that you should not put your food purchases on credit cards. The money lost to credit card interest rates is self-defeating in the long run and will just get you further into a problem rather than getting you out of it. If you are the type who can and does pay off their credit card purchases every month when the bill comes due, then using

FOODSTUFF	QUANTITY/PRICE	FOODSTUFF	QUANTITY/PRICE
white rice	5 lbs./\$1.79 10 lbs./\$3.45 20 lbs./\$6.90	pinto beans	2 lbs./\$1.00 10 lbs./\$4.49
Tang (makes six quarts)	21 oz./\$2.99	all purpose flour	10 lbs./\$2.10 5 lbs./\$1.19
white sugar	5 lbs./\$1.99	vegetable shortening	5 lbs./\$2.39
powdered milk	25.6 ozs./\$4.39 (8qts@3.2oz./qt.) 64 ozs./\$9.99 (20qts@3.2 oz./qt.)	canned tuna	6 oz. can/50¢
canned carrots	14.5 oz. can/50¢	canned spinach	13.5 oz. can/69¢
canned pumpkin	15 oz. can/\$1.09	canned turnip, kale, mustard or collard greens	14 oz. can/50¢

one might be a real convenience; otherwise it's a temptation to be avoided.

Fortunately, the financial outlay need not be so great that you must spend your children's college fund or sacrifice your retirement account. With a little forethought and research it might be so little as to represent the family foregoing one restaurant meal a month or renting a video to watch at home rather than paying full admission to see a first run film at the theater.

As a matter of fact, unless you are compelled by special circumstances to do otherwise, you are better off to not spend a lot of money at first. Like many other long term projects, there is a learning curve involved with building a good food storage program. Your initial purchases will most likely be small while you're learning more about what you need to do. In this way you are less likely to make expensive mistakes that will have to be corrected later.

If you can afford to spare as little as ten dollars a week then you can make a solid beginning in putting food by against time of need. Just today I made a trip to one of my larger local supermarkets, Albertson's, and wrote down a few prices. (See table.)

Rice, flour, beans, milk, sugar, shortening, Tang, canned greens, car-

rots, pumpkin, and tuna will make for a pretty bland diet, but for only \$40 and a month's time it will give you a solid start on a good program. In the second month you can begin to expand the variety of foods in your program.

The specific types and amounts of food I've listed are not meant as rigid rules, but as illustrations of what can be done. Your personal tastes and the circumstances of the scenarios you'll be planning for are what should determine your specific purchases. It is important to only purchase those foods you are presently already eating or are willing to learn to eat starting as soon as you purchase it. Otherwise, there will be the temptation to leave it in its container and not use it. This is bad planning because it leads to failure to rotate the foods out in a timely fashion as they age or lose nutritional content and palatability. By not using the foods in your storage program you also do not get the experience of how to make them into tasty, attractive meals your family will want to eat. This will leave you at a severe disadvantage when the crunch comes and what's in your larder is all you're going to get.

As I cover each purchase I'll give some considerations you should think about such as: If you don't foresee

having a way to bake bread, then buying a lot of flour might not make much sense, but you might make flat breads instead or learn to do your baking in a Dutch oven. If some of your short term plans call for removing to another location on short notice, then the food for that part of your planning needs to be of a type that can be eaten with little preparation or cooking being required. If safe water will be in short supply, then foods that require a lot of it to prepare them might not be a good idea.

The foods that I have chosen all have excellent storage characteristics for the short to medium term, up to about two years. Detailed information and instructions on storing foods may be found in my Prudent Food Storage FAQ. If you have Internet access you may download a copy free from the Providence Cooperative web site at <http://www.providenceco-op.com> or from one of the host sites that also carry it. Many of them may be found by searching on the term "prudent food storage" using most any search engine.

The first week

Your first \$10 storage food purchase buys 10 pounds of rice, 2 pounds of beans, a jar of Tang, and 5 pounds of vegetable shortening. The 17 cents change is carried over into the next week.

This amount of rice and beans gives a ratio of 5:1, a perfectly acceptable essential amino acid balance (commonly called "making a complete protein") for most healthy adults. An extra \$3.45 expenditure will double the amount of rice and another \$3.49 will buy five times the amount of beans. Purchasing the rice and beans first means you have food that can be made edible with no other foods having to be added to them and needing no preparation other than boiling. If cooking fuel is short, split peas, lentils, and black eyed peas cook

quickly. Pre-soaking and/or pressure cooking is even more economical.

The Tang orange drink provides 100% of the US RDA vitamin C requirement in every 8 oz. glass (6 qts. = 24 8-ounce glasses), lesser amounts of other important nutrients such as vitamin A as well as some sweet taste since we have not yet bought anything else with sugar in it. Vitamins A, C, and D are the major nutrients typically lacking in most storage foods. Don't assume that any drink mix or canned juice has vitamin C in it. Read the nutritional facts label on the side closely to see what the manufacturer claims it contains. An appalling number of juice products, even some canned citrus juices, claim no vitamin C content at all.

The last purchase is the can of vegetable shortening. Fat is actually a necessary nutritional component even if we do tend to eat too much of it in the present day U.S. The shortening allows you to make foods such as biscuits, fry breads, refried beans, pancakes, fried rice and pan breads, and contributes flavor. In a survival diet, fat is an important source of vital calories. This is an important consideration for small children, pregnant women, the elderly, and the ill who might otherwise have trouble eating enough bulky beans, rice, etc., to gain sufficient calories to stave off weight loss and possible malnutrition.

The second week

Your second \$10 nets you 20 pounds of all purpose white flour, 5 pounds of granulated white sugar, 3 cans of carrots, and 3 cans of spinach. The 24 cents left over is carried over into the next week.

You now can make bread to give some variety to your rice and bean diet. If you don't have any store-bought yeast to raise your bread, you can do what your pioneer forebearers did and learn to make "sourdoughs" to leaven it. If you have a grain mill or can acquire one then you may be able

to find a local source of whole grains at a reasonable price to supplement or replace the white flour. The sugar allows you to make sweet breads, puddings from the flour or rice, adds calories, and greatly contributes to taste.

Of all the canned vegetables to be had from the grocer the dark green and the orange vegetables give the most nutritional value for the money. Canned greens such as turnip, mustard, collards, spinach, and kale range in value from 50-110% of the RDA of the important nutrient vitamin A (in the form of carotene) per half-cup serving. Many of them also include a fair amount of calcium and vitamin C as well. The carrots have 100% RDA of Vitamin A per half-cup.

The third week

The third ten spot buys you the 64 oz. box of dry milk. The slim remaining penny is carried over into the next week.

Sixty-four ounces of non-fat dry milk will make 20 quarts of skim milk to provide essential amino acids, necessary calcium, along with vitamin D (30% of the RDA of calcium and 25% of vitamin D per 8 oz. glass of reconstituted milk). Unlike fresh liquid milk, the dry powder is shelf stable and can be stored for long periods of time. It may be drunk as straight milk or used to enhance dishes made from the ingredients purchased in the other weeks. Dry milk can also be used to make excellent yogurt and even non-fat cheese.

The fourth week

Your last purchase of the first month's cycle brings in 10 cans of tuna, 2 cans of pumpkin, and 5 cans of turnip, mustard, kale or collard greens. The remaining 32 cents is added to the surplus from the prior weeks, now totaling 74 cents.

Although the grain, beans, and milk provide all necessary amino acids, most of us will rebel at a purely vegetarian diet, so at least a little meat

three or four days out of a week can go a long way towards making matters tolerable. Other canned meats can be substituted, but as a general rule tuna is leanest and cheapest per ounce. Beware of paying canned meat prices for fillers like pasta, rice, or potatoes. They can be added much more cheaply after the fact rather than buying them already in the can with the meat.

The pumpkin (plain solid pack, not pie filling) can be used like any winter squash, carrots, or sweet potatoes and carries a tremendous amount of vitamin A in the form of carotene (300% of the RDA per half-cup). A friend of mine has developed a pumpkin biscuit that I've grown quite fond of. It makes a good baked dish and is very versatile in casseroles, soufflés, puddings, and as either a sweet or savory vegetable. There's more to pumpkin than pies.

The 74 cents left over seems trivial but it will buy 2 1-pound cartons of iodized table salt, or yeast to make bread with, or baking soda for leavening and other uses, or a small can of pepper to season food. You can also hold it over to combine into the next month's surplus.

The purchasing cycle could be repeated month to month until you reach the amounts you desire, or varied to broaden the selection in your cupboard.

If you can afford to use the economies of scale that making larger bulk purchases gives you, then the price per pound of the foods you buy will drop considerably. By taking advantage of sales, bulk food outlets, warehouse groceries such as Sam's Club and Costco, local restaurant and institutional food suppliers, or ethnic grocers (Asian, Hispanic, etc.) you will do considerably better than what I've outlined above.

If you have the time and resources available to you, much of the fruit and vegetable portion of your storage program can be economically acquired by growing it yourself. Not only do you get wholesome food, but by putting it up yourself you get exactly what you

want in the way that you want it. If being frugal is of paramount importance though, growing your own will need some careful analysis to be certain you're not spending more in time, labor, and equipment than the value of the food will make up for. This is especially true when it comes to food preservation, but you can at least partially offset this by choosing appropriate preservation methods. Pressure canning requires quite a bit of expensive startup equipment (canner, jars, lids, rings, etc.) which may make the operation uneconomical. However, if you dry the food instead you can often do this at a much lower cost.

One area of home preservation that generally will be worthwhile to do yourself is canned meats. Beef, pork, and chicken often go on sale and can be had for quite reasonable prices, so even with the price of the jars and equipment necessary to process it, home canned meat will usually be cheaper per pound than any commercially canned meat of equivalent quality.

There are two cardinal rules of successful food storage: The first is store what you eat and eat what you store. The second is to rotate, Rotate, ROTATE! Follow them always, keep a watchful eye on your local grocer's offerings, and be willing to make a moderate investment of time and effort. Do this and you'll have a successful food storage program that your family will look forward to eating in good times or bad without sacrificing your financial well being to get it. Δ

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A HOUSE FOR AN OUTDOOR DOG

BY TOM R. KOVACH

Dogs are highly social animals and like being around humans when they are given plenty of attention and are well cared for. And sometimes, for various reason, or due to certain situations, the dog or dogs must be kept outside. If that is the case, a proper shelter is very important. Some building and animal supply companies carry adequate, readymade doghouses. But if you're handy with a saw and hammer, and take some pride in doing your own work, here are some tips on what you should take into consideration when building a dog house.

• Not all dogs are suited to outdoor living. Even with a high quality doghouse which meets every requirement of the law, old dogs, puppies, small breeds, and short haired breeds will be severely stressed...even to the point of death...by living outdoors in extremely cold weather. If you do choose to keep a dog outdoors in cold climates, select one of the large, heavy-coated breeds like huskies or malamutes. These dogs thrive in cold weather.

The best doghouse in the world won't keep your pet comfortable if it's not properly bedded. Straw, hay, cedar shavings, or blankets can all be used for bedding, but frequent changes of bedding are necessary to make sure your pet has a clean and dry place to sleep.

• Think small when deciding on the dimensions of your dog's house so that the heat from its body will warm it in cold weather. You need to make allowances for a growing puppy, of course, but an adult dog needs just enough room so that it can sit without bumping its head, turn around and lie down comfortably.

• Proper placement of the doghouse is also important. The door should face away from prevailing winds and, if possible, the house should be placed on the sheltered side (east or southeast) of your house or garage.

- A flap should be placed over the door for extra protection.

An outdoor dog should be conditioned to the weather gradually, starting in early fall. Then stick to keeping him outdoors. It's hard on him to snooze in your warm living room all day and then be put out at night.

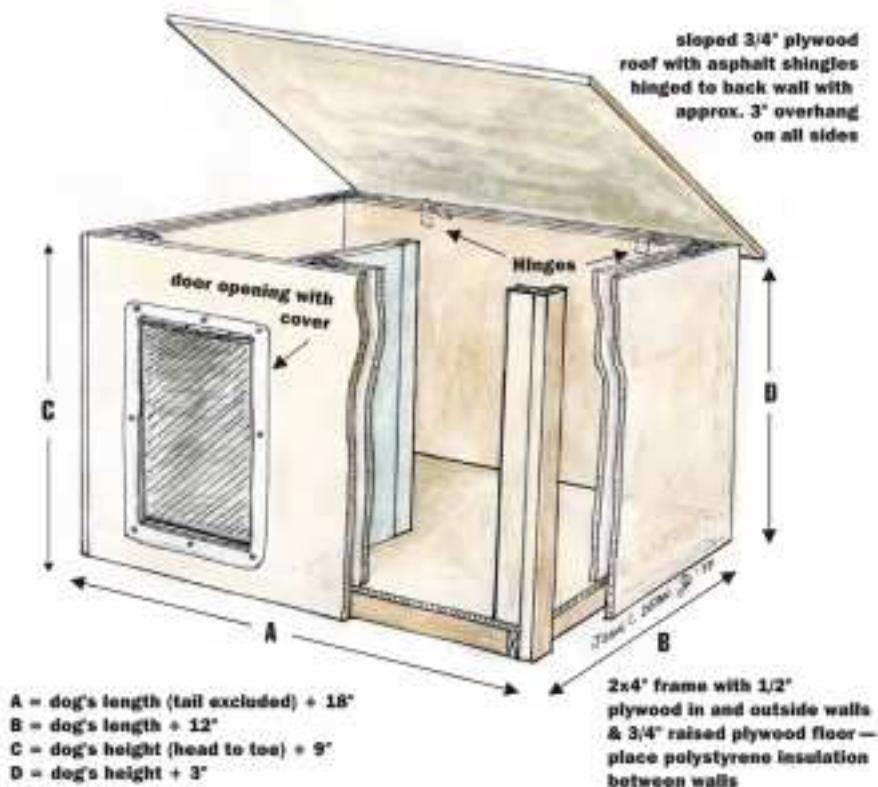
If your outdoor dog needs to be confined for whatever reason, a fenced yard is best. But a "wire run" made by snapping a lead to an overhead cable stretched between two posts or trees will also allow a dog some freedom. Be certain the dog is not tied anywhere where it could hang itself...it does happen.

- Your outdoor dog needs shade available all day long during warm weather...and, of course, a constant supply of fresh water.

- Be sure that construction materials for your doghouse are free of toxic materials, especially for a chewing puppy.

And don't forget that your dog loves and craves your attention...even when it's cold outside and you'd rather be in by the fire. A neglected dog is often a problem dog and may develop such bad habits as barking, chewing, and digging.

Here are some doghouse plans. This sort of shelter can be built fairly inexpensively. Δ



Leaf it to old Mother Nature

By Jim Mcpherson

For most gardeners fall signals the start of winter, a time when tools are put away and you dream about next season's crops. I look at things differently. For me the fall signals the start of one of Mother Nature's great gifts, a gift that means you can guarantee the long-term fertility of your vegetable plot. When those leaves start to fall, I just can't wait to get them gathered in and stashed away.

Walk through any woods and you can't help but notice the thick blanket of fallen leaves. This blanket of leaves plays a vital part in maintaining the high fertility of the woodland, and you can't do better than try to reproduce these conditions in your vegetable plot.

How is it done? It's easy to make your own highly nutritious mulch. All it takes is the effort of collecting fallen leaves and leaving the rest to Mother Nature.

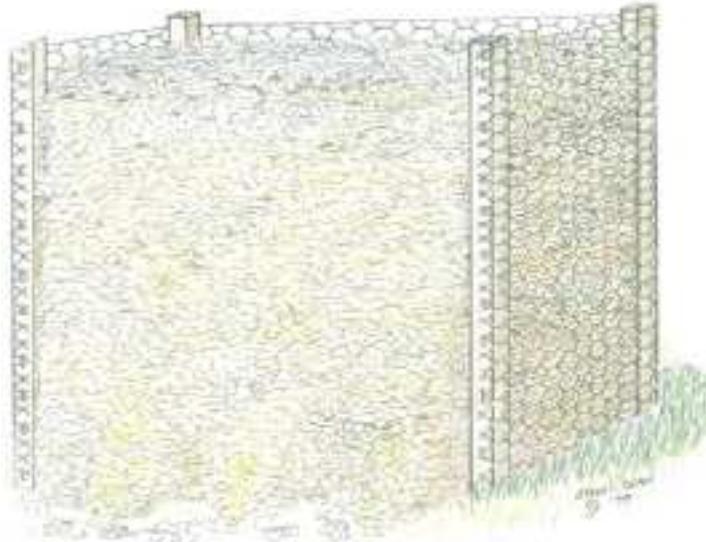
If you have dry soil that suffers from drought, leaf mold will improve its water capacity. If your soil is heavy, leaf mold will open it up allowing worms to do their work. I don't know of any soil that cannot be improved by the application of mulch of leaf mold.

Making leaf mold is just about the easiest job in the garden; all you need

is plenty of fallen leaves and a lot of patience. Only use fallen leaves from deciduous trees, not evergreens. Leaf mold production is much easier than compost-making because you don't need lime or activator. A leaf mold heap does not heat up like a compost heap so beware of adding weed seeds, as they will not be killed by the process.

To construct a leaf mold heap choose, if possible, an out-of-the-way sheltered corner of your plot and knock four stakes into the ground, each three feet apart, to make a three-foot square. Leave about three feet of each stake sticking out of the ground, then staple chicken wire to the posts on three sides of the enclosure. Next fill your wired enclosure with fallen leaves and tread them in firmly. If the leaves are dry, give them a good soaking to encourage the fungi that carry out the decomposition process.

The leaf mold compost should be ready in about a year. If you are in a hurry, production time can be reduced to about six months by mixing grass



cuttings in with your fallen leaves. A mixture of three parts leaves to one part grass cuttings will be about right. Alternatively, a couple of quarts of urine will have the same effect. If you cannot collect enough leaves from your own garden to meet your leaf mold needs, consider asking your parks department. Play your cards right and they will even deliver for you. Or why not always keep a large plastic bag or two in your car, ready to scrounge your own leaves when the opportunity presents itself. Δ

COMPARING THE NUTRIENTS

Source	Nitrogen	Phosphate	Potash
Oakleaf	1.3%	0.1%	0.2%
Peat	1.4%	0.2%	0.2%
Compost	1.2%	0.4%	0.8%
Well-rotted manure	0.7%	0.2%	0.3%

Comparing its nutrient content with other sources of organic matter, it can be seen that leaf mold's nitrogen content is an impressive 1.3% It has a higher content than farmyard manure. Most of the nitrogen is locked away in the form of tannins and is released into the soil in small amounts over a number of years, providing a reservoir of fertility.

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www.backwoodshome.com

You can view the foregoing article, along with more than a hundred others from past issues of the magazine.

Harvesting and freezing apples

By Tom R. Kovach

Here are some tips on harvesting and freezing your apples. Apples should be free of bruises, cuts, and punctures. Remember, apples are 84% water and they produce an increased amount of carbon dioxide as they ripen. During ripening, apples can change their color, soften, and become sweeter.

When harvesting apples, remember that they should be picked before they ripen. It is important to know the appropriate harvest dates for your apple varieties.

Apples picked too early will shrivel. They also may not ripen appropriately after harvest. Apples picked too late may have a decreased shelf life due to flesh browning and breakdown.

If you plan to freeze apples, make sure you are using apples that are firm, crisp, and ripe. They should be free of bruises and decay. Avoid freezing apples that have a mealy texture such as the Delicious variety. Apple varieties suitable for pie and sauce are good candidates for freezing.

If you are planning on freezing a large amount of apples, consider making a test batch to see how well the variety freezes. Once apples are frozen, thaw them and boil the slices for a few minutes. If they stay firm, you have a good freezing apple.

One and a quarter pounds or 4 to 5 fresh apples makes a pint of frozen



slices. To prepare your apples for freezing, wash them in cold water, peel and cut them into quarters, then remove the core portion and cut them into pie slices.

To prevent browning, slice your apples into an ascorbic acid mixture. Several options of ascorbic acid mixtures are available in the canning section of most grocery stores. Make sure you follow the package directions or use $\frac{1}{2}$ teaspoon Vitamin C crystals per quart of cold water. After you have soaked the apples in the ascorbic acid solution, drain them well and freeze them using a dry pack or sugar syrup freezing method.

Dry pack freezing: This involves freezing individual slices on a cookie sheet. When they're solidly frozen, remove the slices with a spatula and pack in freezer plastic bags or plastic freezer containers. If you're planning to use

the apples in a pie, place the sliced apples, sugar, and spice mixture into an aluminum pie plate and wrap with heavy foil. When you're ready to bake your pie, you can pop the frozen apple pie mixture out of the plate and slip directly into the crust. Bake the completed apple pie for 400 degrees F for 15 minutes, then reduce the heat to 375 degrees F for 30 to 45 minutes and finish baking the pie until the crust is golden brown and apple mixture is bubbling.

Sugar syrup freezing: Apple slices can be frozen in unsweetened apple juice or in a sugar syrup. Make a syrup using 2 cups of sugar to 4 cups of water. Add $\frac{1}{2}$ teaspoon ascorbic

acid crystals (Vitamin C) to the sugar-syrup mixture to prevent browning. Pour $\frac{1}{2}$ to $\frac{3}{4}$ cup of cold syrup over each pint of apple slices. Leave $\frac{1}{2}$ to one inch headspace in the freezer container to allow for expansion during freezing. Seal containers, label, and freeze.

Skin-on freezing: Apples can be frozen whole with the skins on. Wash the whole apples, drain, core, and dry. Place them in freezer bags and freeze. When you are ready to use them, run cold water over each frozen apple just before peeling. Apples frozen whole can be used for pie, applesauce, or other recipes which call for cooked apples. Δ



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Seven common medicinal plants

By Marcella Shaffer

Many self-reliant people rely on natural treatments and remedies whenever possible. While there are hundreds of recognized medicinal herbs and plants, many grow only in a specific area or require extensive preparation before using. The following seven plants are commonly found all over the United States. They are simple to prepare and use and, most importantly, are effective.

In primitive circumstances, medicinal plants are usually utilized in three ways: as a tea, a poultice, or raw. When preparing a tea, the part of the plant to be used is gently simmered in water over low flame to release its active ingredients. If the tea is to be ingested, adding honey or other flavorings will make it more palatable.

When preparing a poultice, soak the leaves in a small amount of hot water. While still warm, apply the leaves directly to the affected area and cover with a clean cloth. Change the poultice several times.

When using the plant raw, if possible rinse the leaves to remove any dust or debris. Bruising the leaves before using them will aid in releasing the active ingredients.

One very important consideration: Unless you are positive of the plant's identity, do not eat it or use it! A botanical field guide is an excellent source to use when identifying plants in the wild if you are in question of a plant's identity.

Amaranth, "Amaranthus retroflexus" (or pig weed), is a common plant which grows nearly everywhere. It is found in fields, vacant lots, meadows, and even in some gardens and lawns. It grows from two to three feet

tall with the root and lower part of the stalk being a reddish color. The leaves are green with purple on the under side.

The leaves of amaranth are used for their astringent properties in treating cuts or scrapes. When applied as a poultice, they promote healing and reduce the chance of infection. When taken internally as a tea, amaranth leaves reduce the discomfort of diarrhea.

Comfrey, "Symphytum officinale," is a large plant which grows in a clump, often reaching three feet in height.

It has wide, light green leaves which have a "fuzzy" appearance on the underside. Comfrey is usually a cultivated plant, but due to its invasive growing habits, have naturalized and now grows wild in many areas.

Comfrey is an excellent cell proliferator which helps the body repair tissue damaged by injury, cuts, or over-exertion. Use as a poultice on wounds, bruises, and sprains. Comfrey leaves can also be used raw by placing them directly on the injured area and wrapping with a bandage to hold them in place.

I can personally attest to the effectiveness of comfrey. I have used it on



Yarrow, "Achillea millefolium."

both "two and four-legged animals" as a treatment for cuts and lacerations.

Elder, "Sambucus caprifoliaceae," is a tall growing shrub, usually found along rivers and creeks throughout the United States. While the berries can be eaten raw or processed into jams or juice, the flowers and leaves are used for healing purposes. The tiny, white flowers, which grow in flat clusters, are made into an ingested tea. It is used for all sorts of phlegm-associated



Left: Elder, "Sambucus caprifoliaceae," not yet blooming.
Above: Comfrey, "Symphytum officinale."



Amaranth, "Amaranthus retroflexus," leaves are oval shaped and veined. The dense flowers are green.



Mallow, "Malva parviflora," leaves are roundish and cupped. Pale pink flowers grow along the stem, turning to small round fruits with maturity.



Broadleaf Plantain, "Platago major."



Narrowleaf Plantain, "Platago lanceolata."

ailments and also to reduce fever and aches associated with colds. The leaves can be made into a tea and used to cleanse abrasions and wounds, or used as a poultice.

Honeysuckle, "Lonicera japonica," is a commonly found plant which grows as a vine, often reaching 50 feet in height. It grows wild as well as cultivated. It has tubular flowers which grow in clusters on the tips of the branches. The flowers can be either red or orange and yellow, depending on the species. Use the flowers as a

treatment for feverish colds and flu in the form of an ingested tea.

Mallow, "Malva parviflora," also known as cheese weed, is another plant commonly found in "weed patches." It grows to three feet tall and has roundish, cupped leaves. The flowers grow along the branches with the fruit developing from the flowers.

A tea is made from its leaves and gargled as a sore throat remedy.

Plantain, "Platago major" and "Platago lanceolata," is usually considered a weed. It is found in all parts of the United States. The leaves grow from a base and are usually six to eight inches long. The seed stalks also spike from the base and reach a height of twelve inches.

The cooked leaves of plantain are used as a poultice to relieve pain and itching from bee stings and insect bites. They also have antiseptic properties and can be used to cleanse wounds and abrasions. This is another plant I can verify the effectiveness of.

Yarrow, "Achillea millefolium," grows to two and half feet tall and is covered with soft hairs. Its fluffy appearance belies its strong odor. It blooms with small white flowers in a flat cluster. Yarrow is usually found in

partially wooded areas or along the edges of forests.

Press the leaves into a wound to stop bleeding and help alleviate the pain. A leaf inserted in the nostrils will help to stop a nosebleed as well. △

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Cooking from home storage with rice

Most of the long-shelf-life foods you put into your food storage are good to eat, easy to cook, reasonably priced, nutritious, easily digested, non-allergenic, low in both cholesterol and sodium, and should be high on your everyday shopping list. But there's one food that beats the rest. This extraordinary and versatile food can reduce your reliance on expensive and hard to store protein foods, like meat, and can be used in soups, salads, and main-dish casseroles. You may be surprised when I tell you that this gastronomical wonder is regular white rice. It is the preferred food of nearly half of the world's population and is considered to be one of the world's two most important food crops, the other being wheat. Let's take a fresh look at this marvelous grain and perhaps learn something about its origins, its life cycle, and what it really has to offer us as a primary food in our home storage.

A short history of rice

Rice is a grass similar to wheat, oats, and barley that became a food source to early humans when they first taught themselves to cook. It proved to be an extraordinarily adaptable grain, and its cultivation probably began in many different places at different times. Wild rices, taking footholds in numerous habitats, evolved specific characteristics to ensure its survival in those habitats. Also, as humans began to migrate, they brought their favorite rice with them, often into areas where growing conditions were not suited for the particular rice variety they brought. But people proved to be adaptable, as well as creative, and they again quickly began to develop the art of selective farming, an art that included the effective breeding of adaptable rice varieties, along with making manageable changes in the growing environment to help these rices thrive.

There are about 25 species of rice, but we only cultivate and eat one. Yet, that one species provides the thousands of cultivated rice varieties we grow today.

I first took a serious interest in rice during the Green Revolution of the 1970s. At that time, experts believed the original cultivation of rice occurred in northern Thailand and Vietnam, based on archeological finds of rice grains dated back to 3500 BC. Recently, however, carbon-14 measurements have placed the earliest cultivation of rice in central China, south of Shanghai. These rice remains have been dated back almost 6000 years. By around 500 BC rice was being grown in large parts of India, China, Indochina, the Philippines, Indonesia, and Malaysia. By about 200 BC it was present in Japan and the Middle East. The Greeks and



Richard Blunt

Romans took no serious interest in rice. They regarded it as an expensive and impractical medicine to be used only by rich food faddists who could secure it from India.

However, by the middle of the 12th century we know that rice had made its way to Europe. At that time bubonic plague had killed off about one third of the work force in Europe. With the manpower shortfall, lower yields of staple crops, like wheat and barley, were being harvested. Rice, a high yielding and energy-giving crop that required less labor than other crops, was imported to fill the void. By the middle of the 18th century, rice was being imported in large enough quantities to England to be considered an ordinary table staple.

Just how and when rice finally made it to North America is a matter of conjecture. Some say that rice seeds were taken across from Africa on slave ships. Between 1620 and 1647 unsuccessful attempts were made to plant rice in Virginia and North Carolina. Finally, in the 1690s, rice imported from Madagascar was successfully planted in the swamplands of South Carolina. These mosquito infested fields were tended by slaves brought from West Africa where rice farming was well established. When the Civil War freed the slaves, the affluent culture created by growing and exporting millions of tons of Carolina Gold rice came to an end. But rice made a comeback, and today Arkansas, California, Louisiana, Texas, and Mississippi grow and market most of the rice in this country.

Types of rice

Since the early 1900s botanists have debated just how to classify the endless varieties and subspecies of cultivated rice, but they have not reached universal agreement. In 1928

The term "Green Revolution" describes the highly publicized development and distribution of modern agricultural technology during the 1960s and 1970s. During this period, high yielding cultivars of various crops, but in particular rice, were distributed from technologically advanced countries to major agricultural areas around the world. For example, the International Rice Research Institute, founded in the Philippines, introduced high-yielding, disease-resistant varieties of rice to tropical Asia. The program was so successful that Indonesia, one of the world's perennial rice importers, became self sufficient and started exporting large quantities of rice by the early 1980s. This unexpected turn around caused other rice exporting countries problems as the market price of rice crashed around the world.

a Japanese scientist lumped all these varieties into two groups: long grain, non-sticky rice called **indica** and short grain sticky rice called **japonica**. Since then there has been a third classification added—the long grain sticky varieties

called **javinica**. What makes a rice sticky or non-sticky is the proportion of starch molecules that each grain contains. All cereal grains contain two types of starch molecules: amylose and amylopectin. Amylose starch molecules are more loosely constructed and bond easily with water molecules. This makes the rice sticky. Amylopectin starch molecules are compact in structure, a characteristic that prevents them from easily bonding with water molecules and results in nonsticky rice. All rices contain both types of starch strung together in long molecular chains. Japonica and javinica rice varieties are higher in amylose starch than indica rices and are, consequently, sticky.

Does it need all that water to grow?

Because of man, cultivated rice has evolved over the millennia from a non-water dwelling genus into a water-loving species that now needs a lot of water to really thrive. Some say that water provides a thermal blanket to protect the crop

Baked aromatic rice

This is, in my opinion, one of the most elegant yet simple ways to prepare aromatic rice. The delightful flavor and aroma of this kind of rice is not smothered with unnecessary flavor enhancers, and nothing is added to alter the delicate texture of the rice. If you live in an area that has specialty food stores that sell aromatic rice, like Basmati, I suggest that you buy the best quality rice they have to offer. One of the finest Basmati rices is Dehra Dun, grown in Northern India. It has long white grains and develops a wonderful aroma when cooked the way that I will describe to you. If you can't find imported Basmati rice, the American variety will work well. American Basmati, however, does not have the same intense aroma of the imported variety.

Ingredients:

2 cups long grain Basmati rice	4 Tbsp. unsalted butter
cold water to rinse and soak the rice	1 Tbsp. virgin olive oil
1 tsp. kosher salt	Kosher salt, to taste
4 qts. water	fresh ground black pepper, to taste

Method:

1. Preheat the oven to 350 degrees F.
2. Place the rice in a large bowl and fill the bowl with cold water. Rub the rice between your fingers to remove the surface starch from the grains. Carefully change the water and repeat the rinsing until the water is clear. Drain off and discard the water.
3. Place the rice in a smaller bowl with one quart of fresh cold water. Let the rice soak in this water for at least 30 minutes. Drain and discard the water.
4. Combine the salt with the four quarts of water (that's right, four quarts) and bring it to a boil over medium-high heat. Add the rice and stir the mixture to ensure that the rice does not stick to the bottom of the pot.
5. Cook the rice until the grains are cooked $\frac{3}{4}$ of the way through. When you remove a grain from the pot and bite into it, it should be fully cooked on the outside and slightly crunchy on the inside. This should take about 10 minutes.
6. Immediately drain the rice and rinse with warm water.
7. In a small, heavy-bottomed sauce pan, over low heat, melt the butter with the olive oil. Season this mixture to taste, with salt and fresh ground black pepper. The more black pepper you add, the more flavor this rice will have.
8. Place the rice in a non-stick baking pan and evenly drizzle the melted butter and olive oil on top of the rice. Cover the pan tightly with aluminum foil and bake in the oven for 15 to 20 minutes.
9. Remove from the oven and let rest for five minutes before serving.

against temperature extremes. Others say that the water in flooded fields serves to drown weeds that would otherwise compete with the rice seedlings.

A healthy rice paddy can best be described as a complex ecological system, like an aquarium. The water helps to maintain a proper balance of beneficial bacteria and complementary microorganisms. This natural balance is maintained by proper management of the irrigation system, because a field is only flooded for part of the growing season.

In healthy irrigated fields the water is changed several times during the growing season. But rice is incredibly adaptable and certain varieties have thrived in stagnant water. The main difference between rain-fed rice and irrigated rice is that rain-fed rice will, at best, produce only one crop a year. A properly managed irrigated rice paddy will produce two or three, and farmers around the world take advantage of this.

Types of rice and how to use them

In this country there are three types of rice readily available on the retail market: long grain, medium grain, and short grain. Long grain is by far the most popular and the most versatile. It is sold in several different forms. Reviewing all varieties of long grain, medium grain, and short grain rices is beyond the scope of this short article. So

I will focus on the long grain varieties and describe how you are likely to find them in a typical grocery store.

Long grain brown rice: This rice undergoes minimal processing. During the milling process only the outer husk is removed leaving the bran layers intact. It is then heat treated to prevent the bran oils from going rancid in storage. Despite this treatment, brown rice still has a shorter shelf life than polished white rice. But under refrigeration brown rice will keep for more than six months.

Parboiled or converted rice: Parboiling rice is a process that began in India over 2000 years ago. Basically, after the rice is threshed from the stock, it is soaked in water for several hours, then steamed for a few minutes. It is then dried and milled in the usual way. One great advantage of this process is that a percentage of the nutrients contained in the bran are pushed into the starchy endosperm. This prevents them from being lost when the rice is further processed and polished. The process imparts a slightly yellowish color to the uncooked grain. It also requires more water and more time to cook than regular white rice. The term "converted," which is used to mean parboiled, is a registered trademark for Uncle Ben's rice.

For rice storage, converted rice is probably the best there is because it stays stable longer during storage and it will withstand a wider variety of cooking techniques without turning to mush.

No-fail boiled rice

I often listen to people who are excellent cooks complain about how difficult it is for them to cook rice. Some of them have become so intimidated that they avoid rice completely. This is a shame, because cooking rice is less complicated than cooking other starches like pasta and potatoes. When you cook pasta and potatoes it is necessary to constantly test them during the latter stages of the cooking process. One great advantage of cooking rice is that, with few exceptions, it is predictable. Using the proper amount of liquid, cooking the rice in a heavy bottom sauce pan, and keeping your eye on the clock is the no-fail formula for cooking rice. I will prove it to you with the following. This recipe makes three cups of perfectly cooked long or medium grain white rice. The medium grain will be a little softer than the long grain. I don't use any butter or margarine when I boil rice because I can't see any advantage to adding it during the cooking process. I do add a variety of embellishments after the rice is cooked. These include: butter, Parmesan cheese, fresh ground black pepper, olive oil, ground nuts, chopped apples, and chopped fresh chili peppers. Let your imagination be your guide. Who said boiled rice was dull food?

Ingredients:

1 cup long grain white rice
½ tsp. kosher salt
1¾ cups cold water

Method:

1. Place the rice, salt, and water in a heavy-bottom sauce pan and cover tightly, and bring the mixture to a boil over medium heat.
2. When steam starts escaping from the cover, turn the heat to very low. Do not remove the cover.
3. Cook the rice for exactly 20 minutes on low heat, then remove the pan from the burner. Do not remove the cover.
4. Let the rice stand, undisturbed, for another 20 minutes. Remove the cover and lightly fluff the rice with a fork.

Spider rice casserole

If you have a sturdy gas or charcoal grill and a cast iron Dutch oven with a cast iron lid, you can make this whole thing right on the grill. But I suggest you try it first on your range top where you have more control of the heat. My friend, Howard, sears the chicken on skewers over a bonfire, assembles the remainder of the ingredients in his spider kettle, and places the whole thing in the fire for about 45 minutes and it comes out perfect every time. I have not had the courage to attempt this yet. Some day. Some day.

Special Equipment: 1 five-quart or larger cast iron Dutch oven.

Ingredients:

6 skinless chicken thighs
½ tsp. kosher salt
¼ tsp. fresh ground black pepper
3 Tbsp. peanut oil or other light vegetable oil
1 cup diced yellow onion
2 cloves fresh garlic, minced
1 Tbsp. fresh ginger, minced

4 whole cloves
4 whole green cardamom pods
1 three-inch stick cinnamon
¼ tsp. whole cumin seeds
1 1/3 cups long grain brown rice
1 10-ounce can diced tomatoes with chili peppers (Or-Tel brand is best)

1 cup of canned low fat chicken stock
¾ cup of your favorite ale or beer, room temperature and flat
Kosher salt to taste
½ tsp. fresh ground black pepper

Garnish:

2 Tbsp. fresh cilantro, chopped

¼ cup toasted sliced almonds

Method:

1. Combine the salt and pepper and rub this mixture onto the washed chicken.
2. Heat the oil in the Dutch oven over medium heat, then add the chicken in a single layer and fry until the chicken is browned on both sides and cooked about two thirds of the way through. Remove the chicken from the pan and set it aside.
3. Add the onions to the pan and cook over medium heat until they are lightly browned. Add the garlic, ginger, whole cloves, cardamom seed, stick cinnamon, and cumin seed. Cook the mixture while stirring constantly for about two minutes.
4. Add the brown rice and stir the mixture for one minute.
5. Add the tomatoes, chicken stock, beer, salt and pepper to taste, increase the heat to medium high, and bring the mixture to a boil. Return the chicken to the pot and put the cover in place. When the mixture begins to boil again, reduce the heat to low and cook the casserole for exactly one hour.
6. Remove the pot from the heat and let the casserole rest, with the cover in place, for 15 minutes.
7. Before serving, sprinkle the chopped cilantro and toasted almonds evenly over the casserole

The reason whole spices are used in this recipe is that under cooking conditions the flavors are slowly released into the casserole. You can try to find them and pick them out before serving the meal, but I just let people do it themselves from their own plates.

Regular enriched white rice: This is fully milled long grain rice. The bran layer has been removed and the rice has been polished. The rice is then coated with a soluble coating that is enriched with iron, niacin, and thiamin. This rice is whiter than parboiled rice before it is cooked. It also cooks faster and with less water.

Precooked rice: This is simply rice that has been cooked until it is ready to eat, then dried and packaged. Personally, I would rather cook my own rice than pay someone else an inflated price to cook it for me. The small amount of time saved isn't worth the price.

Boil-in-the-bag rice: Again this is only designed to be a time saver and is sold at an inflated price. Boil-in-the-bag is

usually parboiled rice packed in a muslin-type bag, probably for the sole purpose of keeping it from sticking to the pot. It is not for me. We can all learn to cook bulk rice without it sticking to the pot.

The following classes of rice are called aromatic long grain rice:

Basmati: This is a long grain highly aromatic rice that is imported from Punjab India in the foothills of the Himalayas. The individual grains of this rice are longer and thinner than other varieties of long grain rice. I use it when I make pilafs, curries, and biryanis. Biryanis are elaborately layered Basmati rice and meat or vegetable casseroles enhanced with a subtle mixture of exotic fragrant spices.

Fajita rice

This recipe is designed for folks that have limited access to refrigeration and must rely on shelf stable and root cellar foods for their cooking needs. I must say that all fajita seasonings are not created equal. Of the brands listed below, I like the Ortega best. The Old El Paso contains a lot of chile pepper flakes which makes the casserole too spicy. The Taco Bell, and the Chi-Chi's, on the other hand, don't have enough flavor to make the casserole interesting. My daughter, Sarah, was adding my homemade hot sauce to the Taco Bell version.

Special Equipment: 1 five-quart cast iron Dutch oven

Ingredients:

3 Tbsp. virgin olive oil
2 medium yellow onions, diced medium
2 cloves fresh garlic, minced
1½ cups long grain parboiled (converted) rice
1 pkg. fajita seasoning (Ortega, Taco Bell, Old El Paso, Chi-Chi's etc.)

3 cups chicken stock
1 14 oz. can of pinto beans, drained
1/3 cup canned or bottled roasted peppers, diced medium

Method:

1. Heat the olive oil in the Dutch oven over medium heat. Add the diced onions and cook until they are lightly browned.
2. Add the garlic and cook for one minute, stirring constantly, then stir in the rice.
3. Stir the Fajita seasoning into the chicken stock and add this mixture to the pot. Increase the heat to medium high. Bring the mixture to a boil, then add the drained pinto beans and the diced roasted peppers.
4. When the mixture again returns to a boil, put the lid on the pot, adjust the heat to low, and cook the mixture for 20 minutes or until all of the liquid is absorbed. Remove the pot from the heat and serve as soon as possible.

This is one rice that I feel should also be cooked as simply as possible and enjoyed without any other flavoring.

Thai fragrant or jasmine: Another aromatic rice, but imported from Thailand. It is one of those slightly sticky long grain rices that retains its delicious taste and aroma when served cold.

Texmati: This is a hybrid American rice grown in Texas. It is a cross between Indian Basmati and regular long grain white rice.

Jasmati: An American grown Jasmine rice. Not as fragrant as the Thai version.

Storing and using rice

Rice is a hardy grain that will keep almost indefinitely in the original package if stored in a cool, dry place. Once opened it should be transferred to an airtight container before returning it to the shelf. However, because of the oil content in the bran, brown rice has only about a six month shelf life when properly stored in the original unopened container. Once opened, brown rice should be refrigerated in an airtight container. All cooked rice can be kept for about a week when refrigerated. If frozen in an airtight container, it can be kept for about six months. When aromatic rice is stored, it slowly loses its aroma, so it makes a poor storage rice.

Is rice really healthful food? You bet it is. First it contains no bad cholesterol or extrinsic sugar. Extrinsic sugar is the major culprit in tooth decay. Rice is about 80 percent starch which is processed slowly and constantly by the body to deliver a steady stream of energy to the muscles. When we eat the starch, it passes quickly through the stomach and into the small intestine where it is broken down into simple molecules of glucose. Glucose molecules, in turn, pass through the intestine into the blood stream and offer themselves to the muscles as fuel in the form of glycogen. It takes rice starch about 24 hours to pass through the system in this fashion, thereby delivering a steady medium term supply of energy.

One cup of either cooked brown or enriched white rice also contains the following approximate daily requirements of B complex vitamins: Thiamin (vitamin B-1)—30 percent, Riboflavin (vitamin B-2)—about 2 percent, Niacin (vitamin B-3)—10 to 20 percent depending on the type of rice, Pyridoxine (vitamin B-6)—about 6 percent, Folic Acid—about 2 to 8 percent depending on the rice.

Brown rice delivers a higher percentage of these vitamins than white rice. Adults require eight amino acids in their diet to maintain healthy bones, blood, and tissue. One cup of cooked brown rice will provide about 6 percent of this daily requirement. Rice also contains useful amounts of several essential minerals including phosphorus, zinc, seleni-

um, copper, and iodine. One cup of cooked brown rice will provide approximately 7 percent of your daily requirements for fiber. But all rice also contains what nutritionists call resistant starch. Resistant starch is created when rice starch molecules are squeezed so tight during the cooking process that they become indigestible and pass through the system to form bulk in the colon. About 80 percent of the fiber found in rice is said to be resistant starch which means that all rice contains more fiber than we think.

The recipes

I have put together four simple recipes, each using a different type of rice. The first two are formulas designed to demonstrate just how rice can be cooked and served with a minimum of fuss and still be an interesting complement to any meal. The last two are casseroles I learned to make while surf fishing on Cape Cod with five of the heartiest men that I have ever known. The Spider Rice casserole was designed to be cooked over an open fire in a real neat looking three-legged cast iron pot called a spider. The legs allow the cook to put the pot right into the hot coals. The man who taught me this recipe would often make enough of this dish to feed 10 hungry fishermen.

The fajita rice is a meatless dish made almost exclusively with shelf-stable items. This dish is a classic example of how it is possible to prepare gourmet food using storage

ingredients and spending a minimum amount of time in the kitchen.

Rice is an integral part of many cuisines. It is hard to find a cookbook without an interesting rice recipe in it. Look in your own library and I am sure you will find more rice recipes to suit your personal tastes for cooking rice from your home storage. Δ

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Raise Tobacco

for trade or barter in hard times



By Rev. J.D. Hooker

Preparing for a crisis involves many things: storable foods, alternative power sources, dependable water supplies, medicines, guns, ammo, and such are readily available-for now-and this particular magazine has printed enough information on living and maintaining a self-sufficient lifestyle that every reader should already know at least the basics about preparing for nearly any crisis.

So probably the next most important thing we need to consider would be how we'd continue to manage should such crisis become an ongoing situation. If the worst happens, what options will we have available when it finally comes time to replenish or replace some vital item or other? Suppose you've just hammered in your very last nail, but the hardware store and lumber yard have both been closed for months. What can you do? What do you possess that someone else would be happy to trade for, and that you can afford to barter away? To put yourself more in demand, what can you have for

barter that no one else around you has considered?

One worthy answer that comes to my mind (possibly because of the cloud of rich burley smoke swirling from my pipe as I sit here writing this) is tobacco. Whether the person you're attempting to trade with is actually a nicotine addict or someone raising sheep that have developed a severe worm infestation, a supply of tobacco gives you negotiating power in a barter situation.

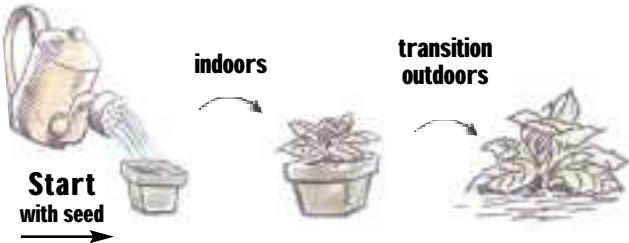
Some readers will recall an article I wrote on raising tobacco in Issue #38 (March/April 1996). At that time I was writing about raising tobacco for your personal use. Its many uses include medicinal remedies. Here I'll talk about providing yourself with a substitute for cash in bad times.

One difference I need to point out from the start is that while confirmed pipe smokers, like I, relish the wide range of tastes provided by growing the varieties available from Native Seeds/SEARCH that I mentioned in that earlier article, the vast majority of smokers puff away on cigarettes, not pipes or even cigars, and need a really consistent flavor.

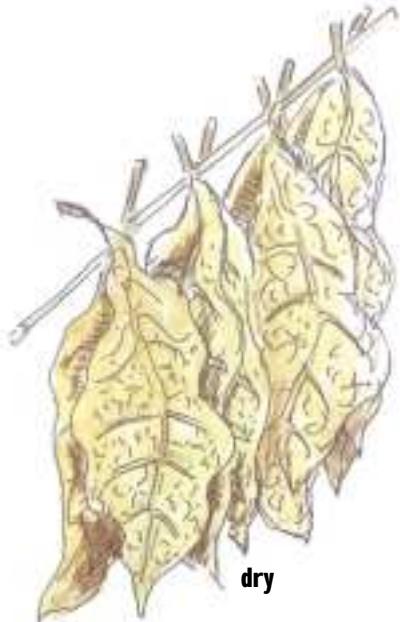
At the same time, when thinking of trade

value you'll need to consider quantity and ease of production as well. For this reason I recommend that most folks stick to raising white burley tobacco. I found seeds available for this variety from Gurney's Seed and Nursery Co., 110 Capitol St., Yankton, SD, 57079. Their Spring '99 catalog now lists this seed for \$3.69 for 1/32 oz. This is an easy variety of tobacco to grow and is probably the easiest to cure. It is also open-pollinated, producing capacious quantities of seeds for future plantings.

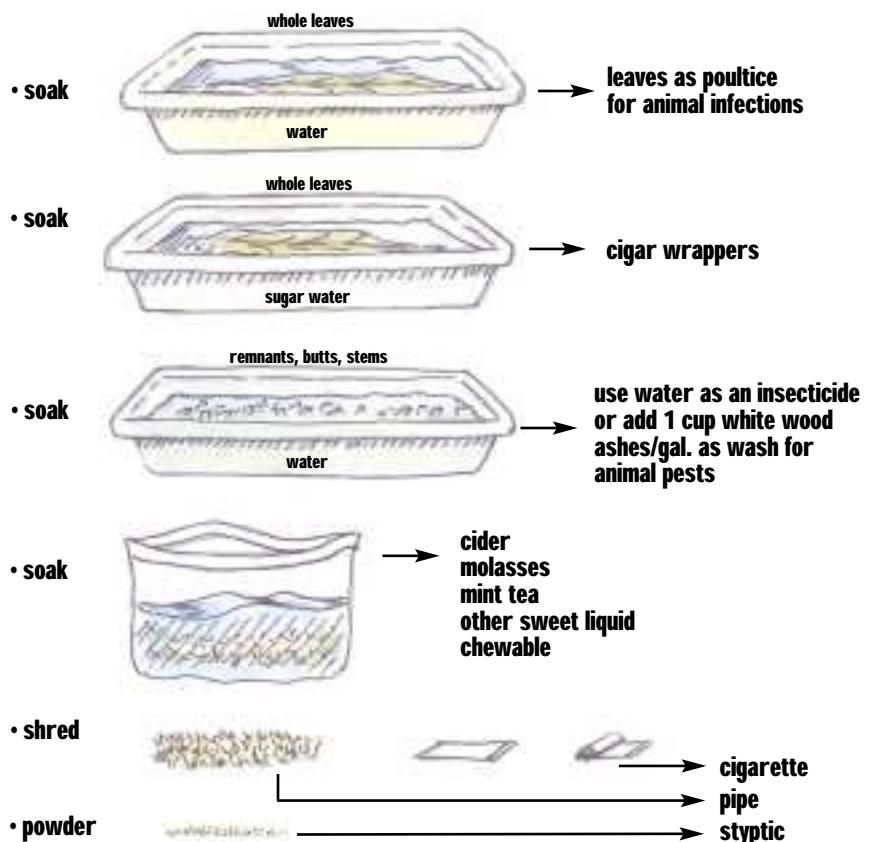
This past growing season we started some of this seed in one of the manure heated hot-beds I covered in an earlier *BHM* issue (Issue #53, Sept/Oct 1998) and some just on window ledges inside of the house, with equally good results. We used empty egg cartons instead of planting flats, filling these with a mixture of roughly equal portions of sand, well rotted compost, and garden soil. These seeds are very nearly as fine as dust, so I used tweezers to place the seeds just barely under the soil's surface.



plants 3ft. apart in rows 4 ft. apart



trade or
process



About seven or eight weeks prior to your area's final frost date seems to be the ideal time for starting these seeds indoors. Treat them just like you would tomato seedlings (which in fact are a close relative), being sure they remain warm and receive regular waterings and plenty of sunlight. Once outdoor planting time approaches, you need to harden these seedlings off in the same manner as tomato starts, gradually exposing them to lengthening periods of outdoor weather before setting them outdoors in their growing area.

When setting the diminutive little tobacco seedlings into the soil, it seems mighty wasteful of space to set them out three-feet apart, in rows four-feet apart. But once this variety stretches out and reaches its full height of five to eight feet, with many leaves measuring 18 to 25-inches long, things can start looking pretty crowded even with such liberal plant spacing. Cultivating to control weeds, regular waterings,

and weekly feedings of weak manure tea will help this crop produce to its full potential.

Don't bother with clipping off the flowers or the seed-heads as you need to with many other tobacco varieties; you can just let white burley produce all the seed it's capable of. Simply harvest the leaves individually as each one starts to die off and turn yellowish. Actually, in most cases, if you just string the leaves together on a cord (we use braided fishing line) and hang them indoors to dry thoroughly, most smokers will be sufficiently pleased with your product. When dried in an area where it's protected from direct sunlight, this variety ends up with a mild taste that's reminiscent of both cigarette and cigar smoke.

Should you expect your primary trading partners to be cigarette smokers (most likely the case), you'll want to dry most of your tobacco a bit quicker. We found that if you hang up the leaves in

the manner just explained, but only until they've turned a nice yellow color, then use heat (an oven or a food dehydrator) to finish drying the leaves out quickly, the taste of the end product was pretty well indistinguishable from commercial cigarettes.

While simply shredding or rubbing these dried leaves to produce a roll-your-own type of tobacco will provide you with a barter staple, most tobacco shops carry simple and inexpensive cigarette rolling machines which turn out a nicely finished product (especially interesting should you happen to be a cigarette smoker yourself). I did a little experimenting this past summer and found that using dried corn shucks, which have been cut to shape with one edge "gummed" using any sort of thick syrup (corn syrup, maple syrup, and simple sugar syrup all worked), along with one of these rolling machines, I could make a perfect substitute for ciga-

rettes rolled with commercially made rolling papers.

Should you have any interest in producing cigars for use as trade goods, a friend of mine who grew up raising tobacco as a cash crop showed me one method for making them and it works quite well.

Once the strung leaves are nearly dried, take them down and sort them, reserving the very best whole leaves for use as wrappers. Allow the wrapper leaves to soak in sugar water, watered down molasses, or some similar weak sweetener, until softened up. While these are soaking, use scissors to cut the other leaves lengthwise into very narrow shreds, discarding the thick center veins. Now use the whole softened leaves like giant sized rolling papers to hold the shredded filler tobacco together like a cigar. Bind each individual cigar tightly with cord until the wrapper has dried out very thoroughly, after which the sugar that's soaked into the wrapper will bind everything together nicely.

Another close friend who chews tobacco found this white burley to be perfectly acceptable after proper preparation. Once the leaves have been strung on a cord and dried completely, he crushes them with his hands and places them inside an airtight container. A ziplock plastic bag works well. Now he'll add just enough molasses, apple cider, heavily sweetened mint tea, or other sweet and flavorful liquid or syrup to moisten the tobacco. After it's been sealed up inside the container for a few more days to absorb the liquid, he says the results are equal to anything he's ever obtained from the store.

For smoking in my old briar pipe, I simply let the leaves dry slowly in a humid spot. Then I just keep them whole and tear enough off of a leaf to stuff my pipe as needed. I'm fairly certain that most other pipe smokers will be equally pleased with this method.

For several years we've also been using tobacco as a reliable livestock wormer. We've experienced good results. For

many years tobacco was the only stock wormer available and it worked very well. Feeding goats and other grazing animals about an ounce a month seems to keep them parasite free; stalks, stems, and leftovers all work equally well.

Aside from its value as a vermifuge, tobacco has always had a couple of other important medicinal uses as well. It has been used to treat minor livestock injuries, shaving nicks, or other relatively minor cuts and abrasions. Finely powdered tobacco makes one of the finest styptics or blood stop powders available, stopping minor bleeding immediately while preventing infection. In a similar manner, because of its natural anti-infective properties, we've found that a poultice of dampened tobacco leaves works wonders for cleaning infected wounds on animals. In our nation's early years, tobacco was so highly regarded for these attributes alone that a tobacco pouch was pretty well thought of as a basic first aid kit all by itself.

At present, several commercially available insecticides use tobacco, or one or more of its derivatives, as their active ingredient. Like many other gardeners, we've found that a mild tea steeped from tobacco stems, stalks, and wastes is exceptionally effective for eliminating insect pests from vegetables, bushes, and fruit trees. For our own use we dump about two ounces of tobacco into a 55-gallon plastic drum, fill the drum about two-thirds full with water, and allow this mixture to sit for several days. We then use a pump sprayer to apply this homebrewed insecticide wherever it's needed.

Several other gardening folks we know simply toss all of the cigar and cigarette butts they can collect into a container. They then add water and allow the mixture to set for a day or two before straining out the liquid and applying it in a similar manner. The two methods seem to be equally effective.

By adding about a cup of sifted white wood ashes to a gallon of this insecti-

cide, an effective flea, tick, and lice-killing wash is created for use against those irritating blood sucking pests on dogs and livestock.

Considering how inexpensive the initial cost of white burley seed, along with how easily the tobacco is grown and prepared, and all of the uses for the final product, you can see just how valuable a trading commodity tobacco can be. △

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Making maple syrup

By Marcella Shaffer

The art of making maple syrup is generally attributed to the Native Americans. Early settlers arriving in America learned the skill from them. They then went on to improve on the Native American's techniques by creating devices for tapping and collecting the maple tree's sap. These same basic devices and techniques are still used in America today to produce the maple syrup that we enjoy on our pancakes and waffles.

Anyone with access to maple trees, a few tools and equipment, and some basic how-to can make this delicious syrup. If you have never tasted pure maple syrup, you are in for a wonderful experience. In addition to its use as a topping for breakfast foods, maple syrup can also be made into toppings for ice cream and pastries, treats for the kids, or, in a pinch, a source of sweetening.

Selecting a tree

You can use the sap from nearly any of the maple varieties, but the **sugar maple**, *Acer saccharum*, produces the best sap and is the one most commonly tapped. The **black maple** is sometimes used, as is the **Norway maple**. **Sweet maple** trees are native to primarily the northeastern part of the United States, extending north into Canada and west to Minnesota. Although you will be doing the actual tapping in late winter and early spring, summertime is the easiest time to identify the maples. If you are unsure of a variety, have an experienced person identify them for you or use a botanical manual. Mark the tree so you can identify it later when the leaves have fallen.

The tree you select for tapping should not be less than 10-inches in diameter. Smaller trees will not yield well and they may be injured. The greater the diameter of the tree and the spread of limbs, the more sap the tree will produce. A large tree can support two taps.

If you are tapping a tree that has been previously tapped, do not use the same spot. Place the new tap several inches to the side and ten inches above or below. This will permit old taps to heal.

Tools and equipment

Most of the tools you will need for tapping you probably already have. These are: drill, hammer, buckets for collecting sap, and a drill bit. The bit you use should be a little smaller than the spout you will use. Most commercial spouts require a $\frac{7}{16}$ -inch diameter hole.

Equipment for tapping can be purchased (see sources) or you can improvise your own. The first and most important thing you will need is a spout, also called a spile. You can purchase them ready-made for around two dollars each. You can also make your own from a piece of metal tubing or hollowed out wood. The spout should be 3- to $3\frac{1}{2}$ -inches long.

You will also need a container to catch the sap. A coffee can and lid with a homemade metal bail or a pail works well. If you choose to use a pail, devise some sort of lid to keep debris, bugs, rain, or snow out. Sap bags and buckets designed especially for this purpose can be purchased. A sap bag is a washable, reusable plastic container designed to prevent contamination of the sap while it is being collected. They hold about two gallons of sap and are usually used with a special spout which holds them to the tree.



Tapping

Tap your maple tree in late winter or early spring. The best time is freezing nights with sunny days in the 40° to 50° F temperature range. If the temperature turns cold, the flow of sap will stop. It will resume, however, when the temperature turns warm again. You can get some sap at other times, but the spring run is the most productive and produces the best syrup. The sugar content is highest in the spring, flavor is at its peak, and the colder nights help to inhibit the growth of bacteria. Some feel there is less chance of damage to the tree when done at this time of the year.

Make your tap on the south or west side of the tree for greatest production. A later tap can be made on the north side after the sap starts running on that side. Begin by drilling a hole 1½- to 2-inches deep at a slightly upward angle. Locate the hole approximately two to five feet above the ground for easiest access.

As soon as the hole is drilled, hammer in the spout. Use light taps to avoid splitting the bark and damaging the spout. A damaged spout or split bark will result in a leaking tap. Attach or hang your clean catch container.

During a good run, your catch container will need to be emptied as often as several times per day, depending on its size. Always empty daily however. Simply pour the container into a larger pail for storing or transporting to the site where the syrup will be made. Store the collected sap in a covered container in a cool place outside. Freezing does not harm the collected sap. If the weather turns warm you will need to process it.

Stop collecting sap when you have enough. It takes approximately 30 gallons of sap to make one gallon of

syrup. This is why pure maple syrup is so expensive. You should also stop collecting if the sap stops flowing, or if the tree begins to bud. If the sap turns yellow, this is a sign the tree is getting ready to bud. To stop collecting, simply remove the spigot or spile. The hole will seal itself over in a few weeks. An application of tree wound sealer may be applied if you wish.

Making syrup

Syrup can be made inside your home, but due to the tremendous amount of moisture you will be introducing into the air and the sticky residue, it is better done outside or in a shed, outbuilding, etc. (I learned this the hard way when everything became sticky and the wallpaper fell off my kitchen walls.) Traditionally the boiling down of sap was done in a large kettle suspended from a tripod over a fire. Any source of heat will work, however, as long as it is capable of producing heat for a long time. It takes about five hours to boil down five gallons of sap into syrup.

For the boiling down you will need: a long handle stirring spoon, a candy thermometer, a means of straining the syrup after boiling, and a kettle for boiling the sap. The kettle should have a large heating surface and hold at least a gallon of sap.

Begin by straining or skimming the sap to remove any bark, bugs, etc. Fill the kettle about two-thirds full and bring to a boil. Since unprocessed sap is mostly water, it will boil at nearly the same temperature water does at your particular elevation. (You may want to check this in advance if you don't already know.) As the water evaporates, the temperature will slowly rise. When it is six to seven degrees higher than boiling point of water, the syrup is done.

During the first half of the boiling process, the sap can be left unattended. After this point, however, the sap will need to be watched to see that it doesn't boil over or scorch. Foam will

rise to the top which will need to be skimmed off. As the sap nears completion, you may want to bring it inside and finish on your kitchen range to better control the heat and prevent scorching. If you let your syrup boil too long and become too dense, it will develop rock-like sugar crystals on the bottom of the jar during storage.

Before bottling, you will need to strain the syrup. A kitchen strainer lined with a paper coffee filter works good. This final straining will remove any remaining debris and the sand-like deposits which is found in all sap.

Preserving and storage

Canning in Mason jars is the best means of longtime syrup storage. If you do not wish to can it, or have only a small amount, it can be refrigerated.

To can maple syrup, reheat after straining to near the boiling point, then pour into hot, sterilized pint jars. Have the lids hot and sterilized also. Fill to within one-half inch of the top and put on the lid. You can also use paraffin wax for a lid as in jelly making.

Store in a cool place away from direct light. Use your homemade maple syrup like you would any commercially made syrup. The maple taste will be more pronounced than what you are probably accustomed to since many "maple" syrups are corn syrup with maple flavoring added.

Recipes

Some tasty variations you may wish to try are:

**1/2 c. maple syrup
1/8 c. of butter
1/2 c. light honey**

Heat over a low flame until the butter melts. Serve warm on pancakes or waffles. This appeals especially to honey lovers.

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A topping for ice cream or pastries can be made by combining equal parts of maple syrup or corn syrup in a saucepan. Heat over low flame until boiling, stirring to prevent sticking. Add walnut pieces and simmer until it is of the desired consistency. This topping can also be canned using standard methods and processing in a boiling water bath for 15 minutes.

As a treat for the kids you can make maple sugar candy. Heat the syrup until it reaches a temperature 33° F hotter than boiling water. Watch carefully to avoid scorching. Cool to 150° F, stirring until crystals form. Pour into greased molds. Δ

SOURCES

Lehman's
P.O. Box 321
Kidron, OH 44636

G.H. Grimm Co.
P.O. Box 130
Rutland, VT 05072

The solar bakery—quickbreads and cakes

By Jennifer Stein Barker

I have been cooking with the sun for five years now, and find it a wonderful way to take advantage of summer's delightful weather and spend more time outside. My favorite recipes are those which I can toss together and place in the solar cooker, then run off to the garden (perhaps with a timer clipped to my pocket) and work until it's time to check my bread or cake. In winter, I cook on a woodstove, so summer brings a taste of freedom with no fire to build or fuel to consider.

It's nice to have snacking foods and lunchbox goodies always handy for hungry homestead workers. I like my family's snacks to be nutritious and substantial. That way, they do double duty as "real food." Having nutritious

snacks available for midmorning and afternoon helps people avoid overeating at regular mealtimes.

Quickbreads and cakes are wonderful ways to take advantage of carefree solar cookery. Multi-reflector commercial cookers like the Solar Chef and Sun Oven, or homemade SunStar cardboard box cookers, will work best for baking because they approximate the temperatures and baking times of conventional ovens. Of course, the sunnier the day and the better your oven's focus on the sun, the better results you will have.

Quickbreads and cakes do not have very much water mass in them and they will come up to baking temperature quickly. You must put them in a preheated cooker because rising dough must be cooked or it will fall again. Watch your preheating of the

cooker carefully, because an empty solar cooker will quickly get hot enough to smoke the finish off the inside. It is the mass of food inside which controls the temperature. A small jar of water will be enough to moderate the temperature in a preheating oven. A rock or brick placed to heat in the empty cooker will provide mass to help hold the heat whenever you open the door to put food in and it will help provide bottom heat to your baked goods.

Keep track of the temperature in your solar cooker. Put an oven thermometer inside it where you can see it without opening the door. Preheat the cooker to 300-400 degrees F. Being precise isn't necessary because as soon as you put your loaf or cake in the oven, the temperature will fall to 300 degrees or less. Don't worry;

Buttermilk spice cake

I have a friend who used to bring a piece of this cake in every single one of his sack lunches, and I just had to ask for the recipe. Of course, it's a little different now...

Makes an 8X8-inch cake of 12 pieces:

1 1/4 cups whole wheat
pastry flour
1 teaspoon baking soda
1/2 teaspoon cinnamon
1/2 teaspoon allspice

1/4 teaspoon grated nutmeg
1/4 cup buttermilk powder
1/3 cup oil
1/2 cup honey
1 egg

3/4 cup boiling water
1/3 cup coarsely chopped
walnuts

Preheat the solar cooker with 1 cup of water in it. Bring the water to a boil, and have ready for the recipe. Lightly oil an 8X8-inch square cake pan, and line it with bakers paper if you wish.

Sift together the flour, soda, baking powder, cinnamon, allspice, nutmeg, and buttermilk powder. Put the mixture back into the sifter and set aside. In a medium bowl, beat together the oil, honey and egg until very frothy. Sift in the flour mixture in 4 installments, beating well after each (if you are using a hand rotary beater, you may have to stir the last one in with a spoon). Add the boiling water and beat for 1 minute. Fold in the chopped nuts, and pour the mixture into the prepared pan.

Bake until the cake tests done. Remove the cake whole (if you have used the paper), or cool in the pan 10 minutes, then cut into 12 pieces and remove to a rack to cool. Cool thoroughly before storing in an airtight container in a cool place.

Conventional kitchen instructions: Bake in a preheated 350-degree oven for 40 to 45 minutes.

Rhubarb buttermilk cake

Rhubarb needs no added moisture to make a cake, so to get great flavor, I use powdered buttermilk (available at health food stores or in the powdered milk section of the grocery).

Makes one 8X8-inch cake of 16 pieces:

1/3 cup finely chopped walnuts
1 1/3 cups whole wheat
pastry flour
1/2 teaspoon baking soda

1/4 cup buttermilk powder
3 cups diced rhubarb
1 egg
1 tablespoon oil

1/3 cup honey
1 teaspoon vanilla

Preheat the solar cooker and lightly oil an 8X8-inch square cake pan. Sprinkle about half the chopped nuts over the bottom of the pan, and set aside.

Measure the flour, baking soda and buttermilk powder into a medium bowl. Stir until well blended. Dice the rhubarb 1/4 to 1/2-inch (to your taste, it does not need to be perfectly regular). Toss the rhubarb with the dry ingredients and set aside.

Measure 1/3 cup honey, and add the oil, egg and vanilla to it right in the measuring cup. Stir together well, then scrape it out over the rhubarb mixture. Toss and stir until ingredients are thoroughly moistened. The mixture will be stiff.

Spoon the mixture into the pan, being careful to distribute evenly over the nuts without disturbing them. Push down and smooth over the top. Sprinkle the remaining nuts over the top, and bake in solar cooker until the cake tests done.

Let rest in the pan 10 minutes to cool, then slice into 16 pieces and remove the pieces to a rack with a spatula. Serve warm, or let cool thoroughly and then store in an airtight container. This resists becoming soggy, but it is best eaten the first or second day (refrigerate after the first day).

Conventional kitchen instructions: Bake in a preheated 350-degree oven for 35 to 40 minutes, until the cake tests done.

quickbreads and cakes will cook just fine. Turn the cooker as frequently as you can to focus on the sun. Cooking time may only be about 15 to 20 percent longer than in a conventional oven. When your bread or cake looks done, open the cooker and check it. If it isn't quite, then five minutes more will usually do the job.

Solar cookers have a limit to how much food can be put in them at once and still bake properly. This varies with the size and design of the cooker. Two loaves of bread are too much for most cookers. One standard loaf will usually do just fine, and remember: even if the sun goes behind a cloud, and your loaf turns out flat-topped, it will still taste just as good.

I use dark-coated tin pans for baking breads and cakes. If the pan doesn't fit in your cooker one way, turn it a quarter-turn and try it another way. Make sure the pan fits and the cooker is set up for it before getting the cooker pre-heated and the dough or batter in the pan. Your granite-ware may also be used as a baking pan. Δ

Fresh apple bread

This sweet and tender quickbread goes wonderfully in a lunchbox. Use all-purpose whole wheat flour, or a 50-50 blend of bread and pastry flour. If you prefer muffins, this recipe will make a dozen regular muffins.

Makes a 5X9-inch loaf:

2 cups whole wheat
flour (see above)
1 teaspoon baking
powder
1 teaspoon
baking soda

1 teaspoon cinnamon
1 1/2 cups finely
chopped apple
1/2 cup chopped
walnuts
1/4 cup oil

1/2 cup honey
1 egg
1/2 cup milk

Set your solar cooker out to preheat. Prepare a 5X9-inch loaf pan by oiling it lightly.

Sift the flour, baking powder, soda and cinnamon together into a medium bowl. Add the chopped apples and nuts, and toss to coat. In a small bowl, whisk together the oil, honey, egg and milk. Add the wet ingredients to the dry and stir just until all ingredients are moistened. Do not worry about any small lumps.

Bake in the solar cooker until the loaf is golden on top and tests done. Cool 10 minutes in the pan before removing to a rack to finish cooling. This loaf is best stored in the refrigerator, because of the moistness of the apples.

Conventional kitchen instructions: Bake in a preheated 350-degree oven for 50 to 60 minutes, or until the loaf tests done. If the top browns too quickly, put a foil cap over the loaf or put a cookie sheet on the shelf above it.

Teach speed reading to your children even if you can't speed read yourself

By George Stancliffe

For over two years, I have had the hobby of teaching speed reading to people in the community where I live. So far I have taught over 300 people (most of them children) to speed read.

As a result of the many classes I've taught, I've made some observations:

- Children learn the speed reading skill far more easily than adults.
- Children master the skill far more completely than adults do. It literally becomes a natural part of them if they learn it by age 12 or so, just as much as speaking English is a natural part of them.

In fact, recently I made the discovery that children learn to speed read so easily that you can teach kids to speed read even if you don't know how to speed read yourself.

Impossible? Not at all. I even tested the idea out on some school teachers and homeschoolers who gave it the acid test. They did just fine.

One homeschooling mother got her 11-year-old daughter to read comfortably at 12,000 words per minute (most adults read at about 250 to 300 wpm). An English teacher at a local high school got two thirds of her class to catch on to speed reading within four weeks at an average speed of about 4,000 wpm. Others who gave this concept the acid test had similar results.

Let me repeat: The instructors did not know how to speed read themselves.

So why can't I just learn speed reading first, before teaching it to my kids? You can, but in my experience as an instructor, it isn't going to happen. It's at least 10 times harder for an adult to learn speed reading than it is

for a child. By the time you finish struggling through the process yourself you will be so weary that you'll doubt that children are capable of learning it at all. Teaching it is really the easy part.

I've checked out a number of commercially available speed reading courses and they usually don't even allow kids under 11- to 13-years of age to enroll. That's too bad. Ninety percent of my very best students were 12 and under. Most of the rest were aged 13 to 14. Older kids can get good at speed reading but they have to work harder at it. The professionals are locking out most of their star students and only admitting their worst prospects. I believe they don't promote their speed reading courses to kids for three reasons:

- Money. The adults have it, the kids don't.
- The methods *they* use to teach speed reading are so rigorous that no young children could survive them. I took one speed reading course that required one hour of homework each night, much of it in the form of written notes or "recall patterns." No kids will ever keep up with that amount of paperwork.
- It probably has never occurred to them that children could master the speed reading skill very easily, as long as it's presented to them in the right way.

The following method for teaching kids to speed read may not be the only way to teach them. It may not even be the best. But I haven't come across any other that is so simple. And no other method I am aware of allows a non-speed reader to teach it effectively.

This article is an abbreviated plan for teaching your kids to speed read.

Keys to speed reading

There are four major keys to learning to speed read:

- Natural vision
- Visualize
- Relax
- Daily practice

Let me briefly explain each one.

Natural vision: Take a minute right now and look at a picture. Let's just say that you're looking at the Mona Lisa. When you look at her does your vision narrow down to tunnel vision so that you see just her left eye? Of course not. Yet when we look at a page of print we have been trained to have tunnel vision. You may as well read through a straw.

You need to look at a page of print with the same natural vision that we use to see a whole picture at once. With natural vision you use your whole field of vision (peripheral vision) to catch large blocks of print on a page. You not only see 3 to 10 words per line, but you also see 3 to 10 lines of print at once also.

Using your natural vision to see the words is the chief cornerstone of speed reading.

There are many different ways of seeing all the words on a page using your natural vision. By experimenting you will find the method that works best for you. (Figure 1.)

Visualize: Have you ever read a really good book, one that was so good that you felt that you were living inside the story, or you were able to picture it in your mind so well that it was like watching a good movie?

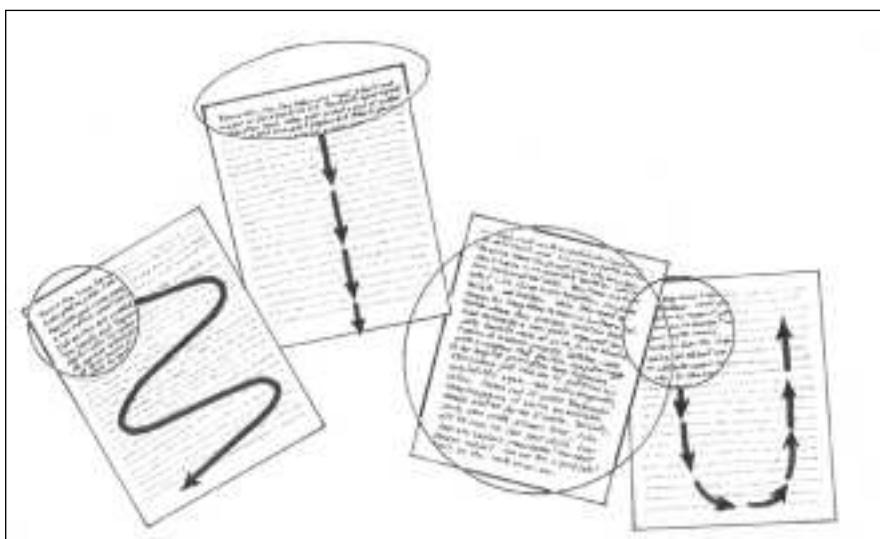


Figure 1. There are different ways of seeing all the words on a page using natural vision. By experimenting you will find the method that works best for you.

Well, that is your goal when you visualize.

The trouble is that your mind has never visualized at this while reading before, so it will take effort to jump-start the visualization process. In fact, for the first day or so, it may seem impossible. But keep trying anyway.

Relax: Normally, when people concentrate on something they focus their minds on something and become somewhat mentally tense. With speed reading it is different. To get maximum comprehension, one must be relaxed while concentrating (visualizing). One can get a feel for this relaxed feeling after doing the casual reading exercise that I explain later. Once you get a feel for how to properly relax while visualizing, it will become easier to become relaxed whenever you speed read.

Daily practice: The importance of daily practice cannot be overstated. After teaching many speed reading classes, one trend has become obvious: Those who practice daily are the ones who get really good at speed reading while those who neglect it don't get good at it.

Of course, all is not lost if you forget to practice once or twice each week. But the more you skip practice, the

worse your end result will be. This is especially true for adults. Sometimes I get kids who forget to practice regularly who still catch on to speed reading. However, they don't get as good as the kids who are diligent in their practice. I recommend at least 15 minutes of relaxed, casual speed reading each day. This is in addition to the regular lessons.

Preparation & equipment

Before we start, here's the preparation we need to make:

a) Mark out on the calendar one month that you will stick to the program of at least two speed reading lessons per week. Of course, the more lessons you have per week, the better your results tend to be. This is because even when the kids forget to practice on their own, they will still get some daily practice for that day during the lesson.

When I teach a speed reading class twice a week, I make the lessons 90 minutes long. However, when I teach daily classes, 25 to 30 minutes is sufficient, as long as you make good use of your time. One homeschool parent I know found it more effective to break practice sessions up into 15 minute

blocks, twice per day. Her daughter got to where she could cruise at over 10,000 words per minute with good recall.

b) Collect enough *interesting* reading materials. Anything that is easy to read and interesting is appropriate: Goosebumps, Hardy Boys, Babysitter's Club, etc.

But please note: a few kids have difficulty catching on to speed reading using books containing regular-sized print. So what I usually do is start all of them off, for the first day or two at least, with something that has very large print. If they are 10-years-old or older, the large-print edition of Reader's Digest magazine is good. If that is too technical for them, then the Little Sisters series by Ann M. Martin has the largest-sized print that I've seen for regular reading books for kids. Try that. After a few days, at most, they should ease their way into normal-sized print.

All these materials should be easily available at your local library. Yard sales and Goodwill are another possible source.

c) You'll need a watch with a second hand for timing regular drills and tap drills.

d) You may need to make arrangements with other homeschooleders to get enough kids together to do a class.

It has been my experience that kids learn to speed read better in a group setting than they do in a tutoring environment because in any group of 6-10 kids, there is almost always at least one kid who will catch on to the skill immediately, usually within three days or so and sometimes on the very first day. The others will try hard, but may not get it for a couple of days more. If there isn't someone in the group who catches on to speed reading really soon, it is easy for most kids to give up on speed reading after the first week. Outwardly they may go through the motions, but secretly they are saying, "This is baloney, nobody can read this fast."

To keep the kids (and adults) motivated, it is important to insure that there is at least one kid in the class that will be the catalyst that will help motivate the others. Once they see others speed reading in real life, or even doing it themselves, it is much easier for them to "remember" to practice every day on their own.

e) Also plan to have a minimum of two months follow-up after the initial month of instruction. This consists of getting them into the habit of always speed reading 10-15 minutes per day on a continuing basis. This is not only easy to do, but it's necessary. This 10-

While doing drills, the focus is on visualization. Of course, we attempt to recall what we can immediately after each drill. But good recall may not always be attained. Sometimes there may not be any recall at all. This is okay. Just the effort to visualize, alone, is the main point of the drill.

After a couple of weeks, fair comprehension (35% to 65%) is commonly attained in drills. I come at the comprehension figure by just asking the student, "About how much of the material are you understanding?" The students actually have a pretty good idea of how much they've learned.

onds to complete each page. Tap your pen on the table every three seconds for about three minutes. Then give them another three-minute tap drill at two seconds per page. Finish off with a one second tap drill for three more minutes. I usually do two or three tap drills per day just after a series of drill sets, but they can be useful any time the kids are starting to slow down too much.

Casual reading: Usually, at the end of each lesson I have 5 to 10 minutes of what I call "Casual Speed Reading" or just Casual Reading. The goal is to learn to relax while concentrating and visualizing. Go through the book at a comfortable rate, usually about three to five seconds per page—faster if you wish. Just make sure it is an even methodical pace. Don't worry if you have already read part of the book before while you are going through. Keep alert, deep seeing large groups of words with your peripheral vision. Keep trying to Visualize and Relax at the same time.

While students are doing the casual speed reading, discreetly time how many seconds per page they are reading. This way you can calculate an approximate reading speed for them. Many children's books have around 200 words per page, so six seconds per page would be 2,000 wpm; 4 seconds per page, 3,000 wpm; 2 seconds, 6,000 wpm; and 1 second, 12,000 wpm.

During the casual speed reading, quietly announce to each student what his reading speed is so that each will know his progress. I also ask them how much they are understanding. Often it is quite a bit. I have found that this alone motivates kids more than almost anything else. They had no idea that they could read 3,000 wpm or better. That's 10 times faster than most college graduates.

Occasionally, someone will get bogged down in an interesting story and revert to the old way of reading. When this happens, just encourage him to speed up next time.

It may sound crazy, but you don't have to know how to speed read yourself to teach speed reading to children.

15 minutes should be spent speed reading books that are enjoyable to the child. No pressure. Just, "Here, read this book and tell me about it." That's it for the day. Most kids can speed read a fun book in 10 minutes or so.

Now that you have made the preparations for teaching the course, it is time to discuss the basic activities that take place during class time. After that I will present a simple lesson plan that will help you to quickly see how a block of class time should proceed.

Basic class activities

Drills: A drill is a timed period (usually 30 seconds long) in which the student speed reads as many pages as he can. Afterwards, he reports on what he recalls to the instructor or to a class partner.

Speed reading drills help to build speed. They are short enough to enable the student to recall at least some of what he reads, yet long enough to make a significant dent in a reading selection. I encourage students to see at least six pages during a drill. It's common for 10-year-olds to be two or three times faster than this.

Reading speed during drills is different for each student. Some kids only see 6 pages, while others can read 15 to 20 pages, or more, with good comprehension during one drill.

Drill sets: In this course, speed reading drills are arranged into sets of three drills each. This is for the purpose of building greater speed and comprehension than would be achieved by reading each selection only once.

Commonly, on the first drill, a student will read only a few (example: five or six) pages in 30 seconds, and his comprehension will be not-so-good. I'll count any comprehension, even if he understood it only as he was reading through the selection but forgot it immediately.

However, the second time through the same story, he will often go faster, like seven or eight pages, and he will comprehend it better at the same time.

Then, finally, on the 3rd drill, the student will often be capable of even better speed and comprehension.

Tap drills: Tap drills are absolutely essential to building and maintaining high reading speeds with good comprehension. Here's an example of how I do them: Give the students three sec-

Fun rewards: Bored children will not practice on their own, no matter how much you nag. Uninterested kids will not even believe that speed reading is possible. I vividly recall one class of third and fourth graders I taught. On the second day of class I nonchalantly asked them which ones had practiced for at least 15 minutes the previous night. Only three children raised their hands. I then pulled three packs of Grandma's Cookies out of a hiding place, tossed them to the diligent ones for a reward, and announced to the others, "Gee, that's too bad nobody else remembered to practice."

A few happy kids ate cookies in front of their friends that day. That's bad manners, but it's good motivation. Nobody forgot their homework again. I reward the kids for their efforts every day. I also reward them for achieving their goals in any activity that I can think of to keep the excitement up. I rarely forget to bring something for those who make the effort. It makes a big difference.

Lesson plans

For these lessons I am assuming a 45 minute block of time is available each day for five days per week. This course will last for four weeks.

Lesson 1: The lesson plan for Lesson 1 is different from the rest of the lessons. That is because this is where the children are introduced to all of the basic concepts and activities of speed reading. After Lesson 1, the rest of the lessons are pretty similar, the main differences only being the alterations you make to tailor the course to fit your needs. Conduct Lesson 1 as follows:

1. Pre-test the students to tabulate current reading speed.
2. Explain natural vision. Give the kids five seconds to see all the words on one page using Natural Vision as you've explained it. Tell them, "Do not try to understand anything. If you understand anything you are going too slow." Repeat this step, if necessary

until all the kids understand the concept of Natural Vision.

3. 30 Seconds: See all the words clearly, on as many pages as you can. Do not try to understand anything. This is only for the purpose of getting used to using your Natural Vision. If the kids aren't seeing at least six pages of print clearly, repeat this step so they learn to go *fast*.

4. 30 Seconds: Going at least as fast as you did in step 3, try to understand one word per page. Do not slow down for this. Don't stop so that you can better focus in on any particular word. Only use your Natural Vision. Report how many pages you covered.

Usually, if you concentrate, a random word will jump out at you from somewhere on the page. Don't slow down to think about it when it jumps out at you. Just keep going fast. Also, this word will vanish from your mind just as fast as it came. Don't worry about that. It still counts. Recall will come later with time and practice.

5. 30 Seconds: Understand 3 words per page, otherwise same rules as for step 4.

Report how many pages you covered.

6. 30 Seconds: Understand five words per page. Same rules as step 5.

7. 30 Seconds: Understand seven words per page. Same rules as step 5.

8. By now they should be used to using their Natural Vision. We will now work on Visualization.

30 Seconds: See as many pages as you can, and try to get a general understanding of what the story is about. Do not slow down. At least, try not to slow down. Try to Visualize as much as possible. Don't worry if you forget everything immediately after the drill, this is a common occurrence at this point. Just do your best.

9. 30 Seconds: Do the same reading selection again that you did in step 8. Tell the instructor all about it, especially anything new that you didn't catch the last time.

10. 30 Seconds; Same as step 9.

11. Tap drill. Three seconds between each tap for 2 minutes. If anybody finishes their book during the tap drill, they can either start the book over again or pick up another book quickly and keep on going.

Remind the kids during the tap drill to focus their energies on trying to visualize and relax at the same time. Even if they feel like they are getting nothing out of it, they are to at least see all the words on each page with their Natural Vision and try to Visualize and Relax.

12. Two-Second Tap Drill. Same as step 11, but two seconds between each tap.

13. One-Second Tap Drill. Same as step 11, but only one second between each tap.

14. Casual Reading. They should speed read fast enough to challenge themselves, but slow enough to get some enjoyment value out of it.

Try not to go slower than five seconds per page. If only one kid is going too slow, overlook it. But if much of the class is starting to slow way down, start tapping your pen at five seconds per tap and tell them they have to go as fast as the taps or faster.

During the Casual Reading let each child know approximately how fast he is reading.

15. Assign the kids to practice on their own with Casual Reading for 15 minutes tonight.

Lessons 2 to 20:

1. Reward those who practiced for at least 15 minutes last night.

2. Do a Drill Set (three drills) at 30 seconds per drill in the same story or selection. Divide the class into groups of two or three students per group. Have each student tell all their recollections to their partner. Have them be sure to always use Natural Vision and try to Visualize in all their speed reading from now on.

3. New story or section. Repeat step 2.

4. New story or section. Repeat step 2 again.

5. Three-Second Tap Drill for three minutes. Remind the kids to Visualize and Relax during each Tap Drill.

6. Two-Second Tap Drill for three minutes.

7. One-Second Tap Drill for three minutes.

8. Casual Reading. Have them go fast enough to be challenged, yet slow enough to get some enjoyment out of it.

As the kids are speed reading, go to each one and tell him or her how fast he or she is reading.

If any of the children are still using very large print materials, try to wean them off them and onto more normalized print by Lesson 5.

On Tap Drills, kids are always allowed to go faster than the taps if they wish, but not slower.

After Lesson 10 you may want to spend more time on three to five minute Casual Readings, followed by telling your partner all about it, and less time doing the drill sets.

After Lesson 10 you may want to skip the three-second Tap Drill.

Throughout the course, remind the students that they should practice for 15 minutes each day, after the four-week course ends, for the following two months. More would be better. If practicable, make a poster and put it on the wall to remind everyone. Or send a note home to parents to make sure it gets done.

Comprehension

So that you won't get discouraged in the middle of the course, you need to know what to expect. The only kind of comprehension I look for is what I sometimes call "passing through" comprehension. That is, those things that you understand while you are just passing through the reading material. If you understand 70% of the material while you are reading, but one second after finishing you can only remember 20%, I still stand by the 70%.

Why? Because the only difference between the two is time and regular

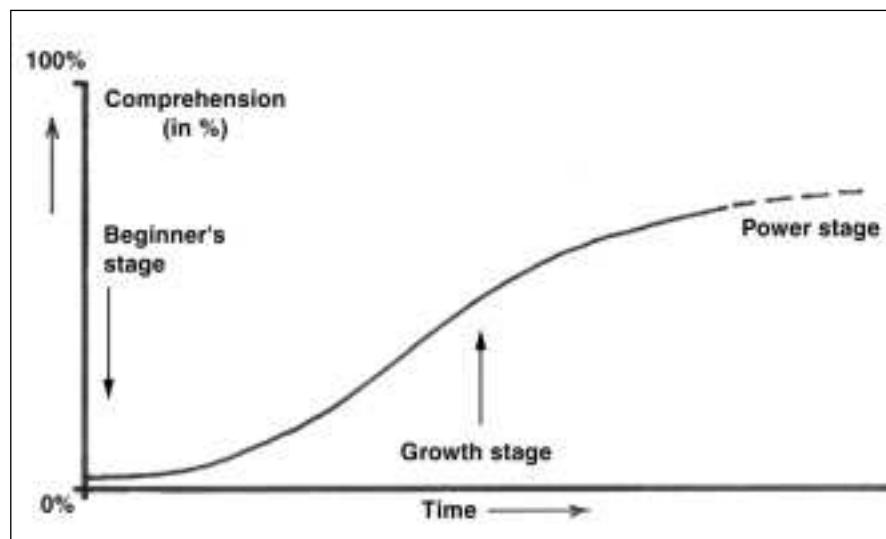


Figure 2 This chart shows how the students' comprehension develops slowly at first, then improves at an accelerated pace before tapering off as it nears 100%.

use of the skill. The part of your brain you use for speed reading has never been used before. And just like a broken leg that has been in a cast for six months and can't yet support you. This part of your brain has no strength to hang on to any comprehension at first. But if you exercise your brain regularly by using your speed reading talent, your ability to recall what you recognize while passing through will increase dramatically.

So the real goal to shoot for is the passing-through comprehension. The long-term recall will just take care of itself with time and regular use.

There is another matter which concerns some kids with regard to comprehension. Some people who don't catch on to speed reading as quickly as others get frustrated because their comprehension isn't increasing as quickly as others in the same class.

I diffuse this frustration by explaining that everybody learns this at a different rate and it has nothing to do with IQ. I draw my Comprehension Chart (Figure 2) and explain the Three Stages of Comprehension that we all go through while learning to speed read:

Stage 1: The Beginner's Stage. This is the first part of the course when we are seeing many words and understanding almost nothing. Some children pass out of this stage on day one. Some adults stay here for three weeks. Most children that I teach stay here for about a week. However, if you are teaching a very small class chances are you may not have that one student who catches on and leads the way and your students may remain at this stage longer than average.

Stage 2: This is the Growth Stage. Your mind is finally able to begin grasping the skill and making sense of the material at high speeds. Comprehension may increase steadily over two weeks time to 60% to 80%. Or it may shoot up to 70% to 90% in just a day or two for some kids.

Stage 3: This is the Power Stage. This is where speed reading begins to be a powerful tool for learning. Comprehension almost levels off, usually at around 60% to 80%. Some kids reach this stage within two days. Others need a few weeks. After this, the comprehension slowly increases just a little bit more each week as it gets closer and closer to 100%. Day by day a student won't notice any

improved comprehension. But week by week, or even month by month, the differences will be noticed.

The Power Stage is also the time when the brain bridges the “recall gap,” where the long-term recall begins to catch up with the “passing-through” comprehension. As always, this happens much more quickly for children than for adults.

Questions and answers

Q. If I learn to speed read, will I still be able to read the old way whenever I need to?

A. Yes. They are two different skills. You'll find that you will prefer to use speed reading for some jobs and regular reading for others.

Q. I want to learn speed reading too. Should I try to teach myself to speed read while I am teaching the kids?

A. I don't recommend it. It usually messes up the system. If you want to teach yourself to speed read, I recommend you teach the kids first and

yourself later, or have one of the kids help you through it.

Q. Is it true that some kids develop photographic memories as a result of mastering the skill of speed reading by the age of 10?

A. In some cases, I believe this to be true. However, more research needs to be done in this area.

Q. How young can kids be taught to speed read?

A. I teach anybody that is reading competently on the 3rd grade level or better, regardless of age.

Q. What about those video or audio courses?

A. I'm sure those courses are good, but they are geared for adults, not kids. Even so, I've never encountered anybody who mastered speed reading from a video course, have you? I believe the reason that in-class courses with real, live teachers are more successful is because in a live class everybody is accountable to a teacher for completing each assignment.

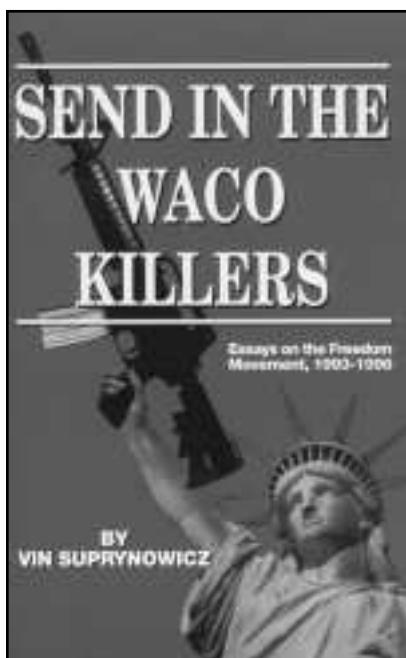
However, in video courses, there is no accountability.

Finally, not too long ago, while I was at the library making some copies, a 10-year-old girl came in. I saw her go up to the checkout desk with a stack of five books. I recognized her as Shawna, who had been in one of my speed reading classes over a year ago. I asked her if she still speed reads and she said she does. Of course, I expected this from looking at the five books she had. Her mother was standing nearby and said that Shawna reads books really fast. Meanwhile, Shawna went back to fetch more books from the shelves.

Moments like this make me glad that I teach speed reading.

(George Stancliffe teaches speed reading for the Yakima, Washington, Parks and Recreation Department. He is the author of *Speed Reading 4 Kids*. He can be contacted at: george@speedreading4kids.com. His book is available from the American Speed Reading Digest, P.O. Box 227, Toppenish, WA 98948.) Δ

SEND IN THE WACO KILLERS



Three times the International Society of Newspaper Editors has included Vin Suprynowicz in their list of the 12 top weekly editorial writers in North America. For years his shoot-from-the-hip style has opened the eyes of thousands to government abuse of our liberties. In this book, *Send in the Waco Killers*, he blends material taken from his syndicated column with new commentary to give the reader a detailed, reporter's-eye-view of how the rights and freedoms of Americans are being subverted.

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Blanching vegetables

By Tom R. Kovach

If you plan to freeze your vegetables, it is a must to blanch most of them. Blanching slows or stops enzyme action which can cause the vegetables to lose flavor, color, and texture. It is very important to remember that blanching time varies with the size and variety of vegetables. Underblanching stimulates the activity of enzymes and is worse than no blanching. Overblanching causes loss of flavor, color, vitamins, and minerals.

There are two ways to blanch vegetables: boiling water or steam.

- First wash, drain, sort, trim, and cut vegetables as for cooking fresh.
- Use one gallon of water per pound of prepared vegetables, or two gallons for leafy greens.
- Put vegetables into blancher (wire basket, coarse mesh bag, or perforated metal strainer) and lower into boiling water.
- Place a lid on the blancher and start counting blanching time immediately.
- Keep heat high for the time given in the directions.
- Cool immediately in ice water for the same time used in blanching (except for corn on the cob). Stir vegetables several times during cooling.
- Drain vegetables thoroughly.
- Pack into container or spread in a single layer on shallow trays.
- Freeze. Δ

Visit the *Backwoods Home Magazine* website at:

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Vegetable	Blanching Time (minutes)
Artichoke, Globe Hearts	7
Artichoke - Jerusalem	3-5
Asparagus	
Small Stalk.....	2
Medium stalk.....	3
Large stalk.....	4
Beans, Snap, Green, Wax	3
Beans, Lima, Butter, Pinto	
Small.....	2
Medium.....	3
Large.....	4
Broccoli (flowerets 1½ inches across)	3
Steamed.....	5
Brussels Sprouts	
Small heads.....	3
Medium heads.....	4
Large heads.....	5
Cabbage or Chinese Cabbage	
Shredded.....	1½
Wedges.....	3
Carrots	
Small, whole.....	5
Diced, sliced or lengthwise strips.....	2
Cauliflower (flowerets, 1 in. across)	3
Celery	3
Corn	
Corn on the cob: (Cooling time for corn on the cob is twice the time for blanching).	
Small ears.....	7
Medium ears.....	9
Large ears.....	11
Whole kernel or cream style.....	4
(Ears blanched before cutting corn from cob).	
Eggplant	4
Greens	
Collards.....	3
All other.....	2
Kohlrabi	
Whole.....	3
Cubes.....	1
Mushrooms	
Whole (steamed).....	5
Buttons or quarters (steamed).....	3½
Slices (steamed).....	3
Okra	
Small pods.....	3
Large pods.....	4
Onions (blanch until center is heated).....	3-7
Rings.....	10-15 seconds
Parsnips	2
Peas - Edible pod	1½-3
Peas - Green	2
Peppers - Sweet	1½
Halves.....	3
Strips or rings.....	2
Potatoes - Irish (new)	3-5
Rutabagas	3
Soybeans - green	3
Squash - summer	2
Turnips	2

Ayoob on Firearms:

"Best buy" Backwoods .45

On the day I'm writing this column, newspapers are reporting the death of racist murderer Benjamin Smith in rural Illinois. Smith's depraved spree led him to shoot some 13 people according to the New York Times. One African-American man and one Korean died of their wounds.

Smith was reportedly armed with two low-powered handguns, a .22 and a .380. In the "count the blessings" department, the eleven surviving victims he wounded can be grateful he didn't have a more powerful weapon, or the death toll among the innocent might have been higher. Smith shot himself three times as police closed in on him, and it took the third bullet to do the job. As a general rule, a weapon you have to shoot yourself with three times to kill yourself is probably underpowered. As callous as it may sound, it's simple logic: if two shots don't stop things for someone who wants to die, we've all had a preview of how effective those same two shots would have been against something large and vicious that wanted *you* to die, and had to instantly be stopped from carrying out that wish.

What is the function of a handgun at a backwoods home? If it's shooting squirrels off the bird feeder, a .22 will do nicely. If it's keeping large, maddened livestock from trampling you, the ranchers who were also world class gun experts—Ross Seyfried, and the late Elmer Keith and Skeeter Skelton—showed us the way, the powerful .44 Magnum revolver.

But the average homesteader's needs may be in the middle. Something that shoots a coyote or a

large feral dog off your lamb. Something to discreetly answer the door with at 3 AM that won't frighten a "friendly," who couldn't miss spotting a rifle or shotgun. Something that could harvest for the freezer a deer that shows up on the property at a time when it's legal, or permanently discourage something the size of a black bear from continuing its deprivations when you can't reach your rifle.

A .45 caliber semiautomatic pistol is capable of all these things. Since the time the .45 ACP (Automatic Colt Pistol) cartridge was adopted by the US military to the present day, it has enjoyed a splendid reputation for potency on the business end with controllable recoil on the competent shooter's end. Though the general armed services adopted the 9mm Beretta pistol more than a decade ago, the .45 remains in service among those on the "sharp end." Delta Force still issues the Colt .45 to all combat personnel, and a special HK .45 was adopted by SOCOM, the Special Operations Command.

Within its range, the .45 does nicely on whitetail deer. When I hunted the fabulous Y-O ranch in Texas almost a quarter century ago (I hear it's gotten even better since), the .45 automatic was the most common gun on the belts of the hunting guides. One police department near me has had "one shot, one kill" results with each of the many injured deer they've had to shoot since they adopted the Colt .45 as a duty sidearm. My department has had the same results on deer and moose since issuing the Ruger P-90 .45. Will it do for the mean stuff? In Africa, I spent time with game ranger Phil Honeyborne, who carried an



Massad Ayoob

American Colt .45 with 230-grain ball ammo mainly in case of lion attack. He had seen what lions do to human beings, and the military .45 slug's ability to punch through more than two feet of meat with eight fast shots left him feeling confident. That same deep penetration, of course, makes hollow-point bullets more sensible for the self defense/anti-personnel function.

There are lots of fine quality .45 auto pistols on the market. You won't go wrong with Colt, Glock, Heckler & Koch, Kimber, Les Baer, ParaOrdnance, Ruger, Springfield Armory, or Wilson handguns. For "best buy" status, though, the hands down winner is the new Ruger P97.

This gun is made with a polymer frame. This lightens weight, reduces cost, and gives the gun a much better "feel" than its predecessor, the P90, which has an aluminum alloy frame under the tough stainless slide and barrel. The P97 shares the older model's splendid accuracy and reliability. It was designed to feed any full-power .45 round, including the widest-mouth hollowpoints.

Dick Metcalf put 5,000 rounds through a P97 for *Shooting Times*

magazine. He reported that there were no malfunctions of any kind. My own P97 fired over a thousand rounds without being cleaned. There was only one malfunction: in the hands of a petite female new to large caliber guns, the slide once failed to go all the way forward. She had been "limp-wristing" the gun (shooting it with a relaxed hold) which will cause most automatic pistols to fail to cycle. She and it worked perfectly together thereafter, since she was now locking her wrist and holding the .45 firmly.

My gun came out of the box shooting dead-on to point of aim at 25 yards. I tested it by firing hand-held over a bench at that distance, in five-shot sequences. I took two measurements of each group: overall for the five shots, and then the best three. I've found over the years that the latter measurement factors out human error and gives you the best idea of the handgun's inherent mechanical accuracy. With Federal 230-grain Match ball, groups were 2 3/16" (all five) and 13/16ths of one inch (best three). The best accuracy came from commercial 185-grain jacketed hollow point reloads by Carwyn Dalke, Pinelane Inc., 40 East Division Road, Valparaiso, IN 46383. All five shots went into an inch and 13/16ths, and the best three found only half of one inch separating the bullet holes, measured center to center.

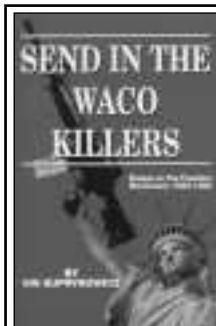
This is national match-winning accuracy combined with battlefield reliability, a rare combination. Rarer still is the low price. At a gun shop in New Hampshire's North Country, I saw a new P97 on sale for under \$400. Suggested retail is \$460. .45 caliber pistols with this degree of combined accuracy and reliability generally go for well into four figures.

The gun only weighs 30.5 ounces unloaded. It comes with two eight-shot magazines and is perfectly safe to carry with a ninth round in the firing chamber with the hammer properly de-cocked. The first double action

shot is smooth and easy to get off. The new mag will work fine in the older P90 pistols, which came with seven-round magazines.

A large caliber gun like this makes particular sense in winter, when criminals are heavily clad. Clothing fabric plugs the hollow cavity in the bullet's nose (as does an animal's fur and tough hide), sometimes preventing bullet expansion. When the bullet is almost half an inch in diameter to start with as the .45 is, a fairly wide wound channel is guaranteed even if the projectile doesn't open up. This is why I've always favored the .45 as a single all-weather carry gun in climates that are sometimes cold.

Ruger firearms have long been favorites in rural America because their trademark design features include ruggedness, reliability, high performance, and low price. The Ruger P97 .45 caliber semiautomatic pistol proudly continues that tradition. Δ



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Roughing it with plastic trash bags

By Christopher Nyerges

On a recent survival trip, I planned for our group to build some lean-tos. I wanted everyone to see what was involved in building such an emergency shelter, and I wanted the students to experience what it was like to actually sleep in one.

However, we planned to stay in an established campsite where we'd have no problems building fires, and I knew that this camp was always very clean. By "clean" I mean that everyone else who camps there scours the area for every bit of firewood and branches for their fire. Also, the local ranger puts Boy Scouts to work by having them rake the area of all leaves so there is minimal danger of wildfires. So I knew we would not have a lot of material to work with for building our lean-tos.

If you have ever built a primitive shelter or lean-to, you learn that location is very important for two reasons. You want a location that is naturally sheltered and away from water so it won't get too cold at night. You also

want a spot where there is an abundance of leaves and brush so you won't be carrying all your building materials a long distance.

So I carried along several large plastic trash bags. This would enable us to walk around the bend where there was an abundance of leaves, easily fill the bags, and then dump the leaves on the lean-to frame, making the job of transporting our building supplies much easier.

We located a tree with a low fork and laid a long stout pole into the crotch. That became the main rafter of our shelter, and we then leaned poles onto that main pole. Finally, we filled our bags, twigs, and small branches and covered the small shelter with about two feet of mulch and debris. It turned out to be a snug and warm shelter.

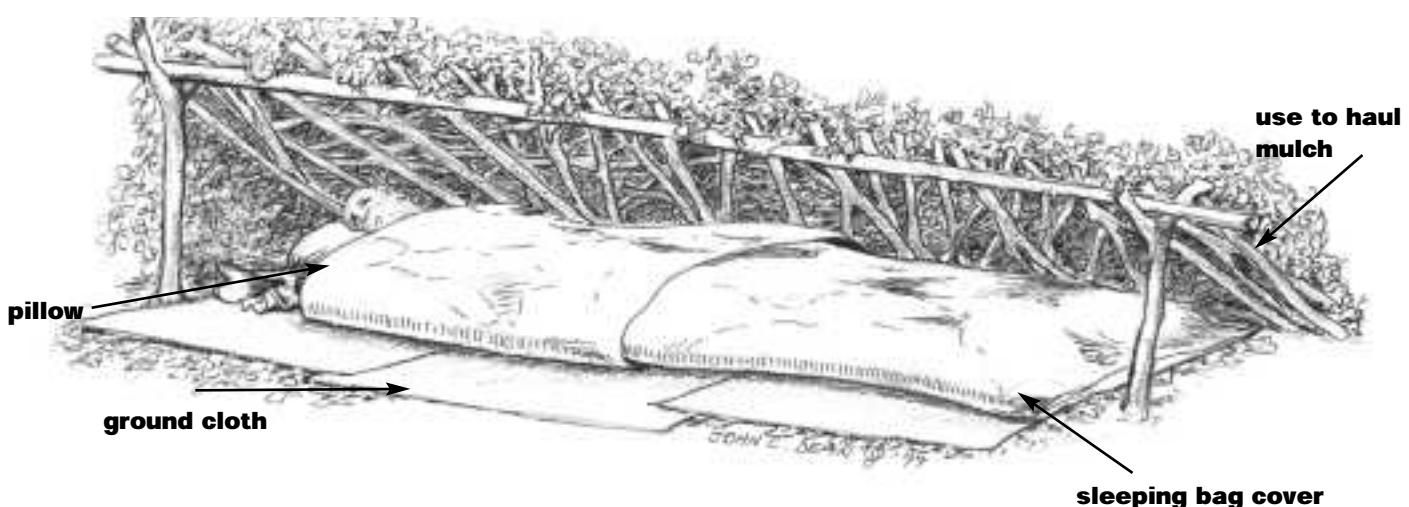
Later that night around the fire, one of the guys commented how handy those plastic bags were for the job of transporting leaves. He pointed to a side pocket of his own pack where he had six of those large, black plastic bags tightly folded and tucked away.

I asked him what he planned to do with them.

"Emergency raincoat," he told me with a smile. In fact, I have used bags like this during downpours and was able to keep myself and my pack fairly dry—at least down to my knees.

We didn't get any rain that weekend, but I knew there was a possibility of at least some rain so I also considered that I'd use two of the plastic trash bags as a cover for my sleeping bag, should the rains come. I would have pulled one up over my feet, and another over my head (cutting out a breathing hole), and tuck the one bag into the other. I have slept in plastic tube tents, and had I needed to use the plastic bags this way, it would have been similar to sleeping in a tube tent.

Plastic trash bags are one of those modern devices that can fill a definite need in a survival situation. I have even used them to wrap items that I wanted to cache in wild areas. Though the plastic does not last for more than a few years before it starts to crumble, it does help protect food and tools from the weather for some time.



A Backwoods Home Anthology

I have found that I can sleep most comfortably on the ground if I have a pillow, something I never carry along with me on the trail. However, a small plastic trash bag filled with leaves or other soft natural material, works fine as a pillow. It is a bit on the noisy side and it is not as comfortable as a cotton-covered pillow, but it still fills the bill.

Another unique use of the large plastic trash bags comes to us from one of Ron Hood's "WoodsMaster" survival videos. Hood shows how you can fill a large plastic trash bag full of soft leaves and use it as you'd use a blanket. Two of these "blankets" provide insulation from the cold and could actually stave off hypothermia in cold conditions. I have even seen people use these bags as water containers in dire situations.

A few other uses come to mind. I have used the trash bags as ground covers and as water or wind-barriers for wilderness shelters. In the garden, I have tied old plastic trash bags to a post about six feet tall and it was the perfect "scarecrow" to keep unwanted birds out of the garden. This is because all the loose flaps make noise in even the slightest wind.

There will always be a few people who will laugh at you when you pull out your trash bags and use them in some of the ways described here. Some folks will think you are homeless, or a bum. Others will think the trash bags not "natural" enough, or not "macho" enough. Don't let that bother you—these bags are so small and lightweight that you really ought to carry at least a few on every outing.

These large plastic trash bags will soon be considered "standard gear," right up there along with such other basics as a knife, fire-starter, canteen, twine, kerchief, etc.

(Christopher Nyerges is the author of *Enter the Forest*, *Guide to Wild Foods*, and *Testing Your Outdoor Survival Skills*, available from the School of Self Reliance, Box 41834, Eagle Rock, CA 90041, or on-line at www.self-reliance.net.) △

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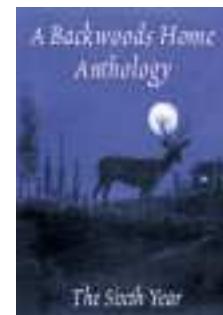
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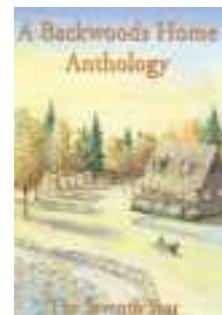
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The Tenth Year

THE IRREVERENT JOKE PAGE

(Believing it is important for people to be able to laugh at themselves, this is a new feature in *Backwoods Home Magazine*. We invite readers to submit any jokes you'd like to share to *BHM*, P.O. Box 712, Gold Beach, OR 97444. There is no payment for jokes used.)

A drunken man staggers in to a Catholic church and wanders over to the confessional box. He opens the door, sits down and says nothing.

The bewildered priest waits for a few minutes, allowing the drunken man some time to collect his thoughts. Growing impatient, the priest coughs to attract his attention, but still the man says nothing. The priest then knocks on the wall three times in a final attempt to get the man to speak.

Finally the drunk replies: "No use knockin' mate, there's no paper in this one either."

Submitted by Bill Duffy

Adam was walking around the Garden of Eden feeling very lonely, and he heard a loud voice ask him, "What is wrong with you?" Adam said he didn't have anyone to talk to. Then the loud voice said he was going to give him a companion and it would be a woman.

He said, "This person will cook for you and wash your clothes, she will always agree with every decision you make. She will bear your children and never ask you to get up in the middle of the night to take care of them. She will not nag you, and will always be the first to admit she was wrong when you've had a disagreement. She will never have a headache, and will freely give you love and compassion whenever needed."

Adam asked "What would a woman like this cost me?"

The answer was "An arm and a leg."

Adam then asked "What can I get for just a rib?"

The rest is history.

Submitted by Bill Duffy

Jack decided to go skiing with his buddy, Bob. They loaded up Jack's minivan and headed north. After driving for a few hours, they got caught in a terrible blizzard. They pulled into a nearby farm house and asked the attractive lady who answered the door if they could spend the night.

"I realize it's terrible weather out there and I have this huge house all to myself, but I'm recently widowed," she explained, "and I'm afraid the neighbors will talk if I let you stay in my house."

"Not to worry," Jack said, "we'll be happy to sleep in the barn, and if the weather breaks, we'll be gone at first light."

The lady agreed and the two men found their way to the barn and settled in for the night. Come morning, the weather had cleared and they got on their way and enjoyed a great weekend of skiing.

About nine months later, Jack got an unexpected letter from an attorney. It took him a few minutes to figure it out, but he

Two men are drinking in a bar at the top of the Empire State Building. One turns to the other and says: "You know last week I discovered that if you jump from the top of this building, by the time you fall to the 10th floor, the winds around the building are so intense that they carry you around the building and back into the window." The bartender just shakes his head in disapproval while wiping the bar. The 2nd Man says: "What are you a nut? There is no way in hell that could happen." 1st Man: "No it's true, let me prove it to you." So he gets up from the bar, jumps over the balcony, and careens to the street below. When he passes the 10th floor, the high wind whips him around the building and back into the 10th floor window, and he takes the elevator back up to the bar. The 2nd man tells him: "You know I saw it with my own eyes, but that must have been a one time fluke." 1st Man: "No, I'll prove it again" and again he jumps and hurtles toward the street where the 10th floor wind gently carries him around the building and into the window. Once upstairs, he urges his fellow drinker to try it. 2nd Man: "Well what the hell, it works, I'll try it." So he jumps over that balcony, plunges downward, passes the 11th, 10th, 9th, 8th floors, and hits the sidewalk with a "splat." Back upstairs the Bartender turns to the other drinker: "You know, Superman, you're a real jerk when you're drunk."

finally determined that it was from the attorney of that attractive widow he met on the ski weekend.

He dropped in on his friend Bob and asked: "Bob, do you remember that good looking widow from the farm we stayed at on our ski holiday up north."

"Yes, I do."

"Did you happen to get up in the middle of the night, go up to the house and have sex with her?"

"Yes," he said, a little embarrassed about being found out, "I have to admit that I did."

"And did you happen to use my name instead of telling her your name?"

Bob's face turned red and he said, "Yeah, sorry buddy, I'm afraid I did. Why do you ask?"

"No need to apologize, Bob. She just died and left me everything!"

A Backwoods Home Anthology

Clyde, a farmer from Palmer, AK, decided his injuries from an accident were serious enough to take the trucking company (responsible for the accident) to court.

In court, the trucking company's fancy lawyer was questioning Clyde. "Didn't you say, at the scene of the accident, 'I'm fine!', asked the lawyer.

Clyde responded, "Well, I'll tell you what happened. I had just loaded my favorite mule Bessie into the..."

I didn't ask for any details," the lawyer interrupted. "Just answer the question. Did you not say, at the scene of the accident, 'I'm fine!...'"

Clyde said, "Well, I had just got Bessie into the trailer and I was driving down the road..."

The lawyer interrupted again and said, "Judge, I am trying to establish the fact that, at the scene of the accident, this man told the Highway Patrolman on the scene that he was just fine. Now several weeks after the accident he is trying to sue

my client. I believe he is a fraud. Please tell him to simply answer the question."

By this time the Judge was fairly interested in Clyde's answer and said to the lawyer, "I'd like to hear what he has to say about his favorite mule Bessie."

Clyde thanked the Judge and proceeded. "Well, as I was saying, I had just loaded Bessie, my favorite mule, into the trailer and was driving her down the highway when this huge semi-truck and trailer ran the stop sign and smacked my truck right in the side. I was thrown into one ditch and Bessie was thrown into the other. I was hurting real bad and didn't want to move. However, I could hear ole Bessie moaning and groaning. I knew she was in terrible shape just by her groans. Shortly after the accident, a Highway Patrolman came on the scene. He could hear Bessie moaning and groaning so he went over to her. After he looked at her he took out his gun and shot her between the eyes. Then the Patrolman came across the road with his gun in his hand and looked at me. He said, 'How are YOU feeling?'"

An elderly man lay dying in his bed. In death's agony, he suddenly smelled the aroma of his favorite chocolate chip cookies wafting up the stairs. He gathered his remaining strength, and lifted himself from the bed. Leaning against the wall, he slowly made his way out of the bedroom and with even greater effort forced himself down the stairs, gripping the railing with both hands. With labored breath, he leaned against the door-frame, gazing into the kitchen. Were it not for death's agony, he would have thought himself already in heaven: there, spread out upon newspapers on the kitchen table were literally hundreds of his favorite chocolate chip cookies. Was it heaven? Or was it one final act of heroic love from his devoted wife, seeing to it that he left this world a happy man?

Mustering one great final effort, he threw himself toward the table, landing on his knees in a rumpled posture. His parched lips parted; the wondrous taste of the

These quotes were taken from actual Federal (US) employee performance evaluations...

"I would not allow this employee to breed."

"The wheel is turning, but the hamster is dead."

"This employee is depriving a village somewhere of an idiot."

"This employee should go far, and sooner the better."

"A gross ignoramus - 144 time worse than an ordinary ignoramus."

"He brings a lot of joy whenever he leaves the room."

"This employee is not so much of a has-been, but definitely more of a definite won't be."

"Donated his brain to science before he was done using it."

"When his IQ reaches 50, he should sell."

"A prime candidate for natural deselection."

"Works well when under constant supervision and cornered like a rat in a trap."

"If you stand close to him, you can hear the ocean."

"If he were any more stupid, he'd have to be watered twice a week."

"If you give him a penny for his thoughts, you'd get change."

"It's hard to believe that he beat out the other sperm."

"Since my last report, this employee has reached rock bottom and has started to dig."

"He would be out of his depth in a parking lot puddle."

cookie was already in his mouth; seemingly bringing him back to life. The aged and withered hand, shaking made its way to a cookie at the edge of the table, when it was suddenly smacked with a spatula by his wife.

"Stay out of those," she said, "they're for the funeral."

Submitted by Jean L'Heureux

TALK LIKE A FROG

A little boy turned to his grandpa and said, "Grandpa, talk like a frog."

The grandpa replied, "What? I am not going to talk like a frog!"

The little boy again asked, "Come on, grandpa talk like a frog please."

Grandpa again said, "No! Go bother your grandmother."

The little boy finally gave up and left.

A little while later the little boy's sister came in and said, "Grandpa, will you talk like a frog for me?"

Grandpa of course replied, "NO!"

The little girl then said, "Please grandpa will you just talk like a frog?"

Grandpa was very disturbed by now and said, "What is it with you and your brother? Why in the world do you want me to talk like a frog?"

The little girl looked at her grandpa and said, "Well, last night Daddy told us that when you croak we are going to Disney World."

Submitted by John Allen

A husband proving to his wife that women talk more than men, showed her a study which indicated that men use on the average only 15,000 words a day, whereas women use about 30,000 words a day.

She thought about this for awhile and then told her husband that women use twice as many words as men because they have to repeat everything they say.

He said, "What?"

WAISING WASCALLY WABBITS FOR DIN-DINS

By Don Fallick

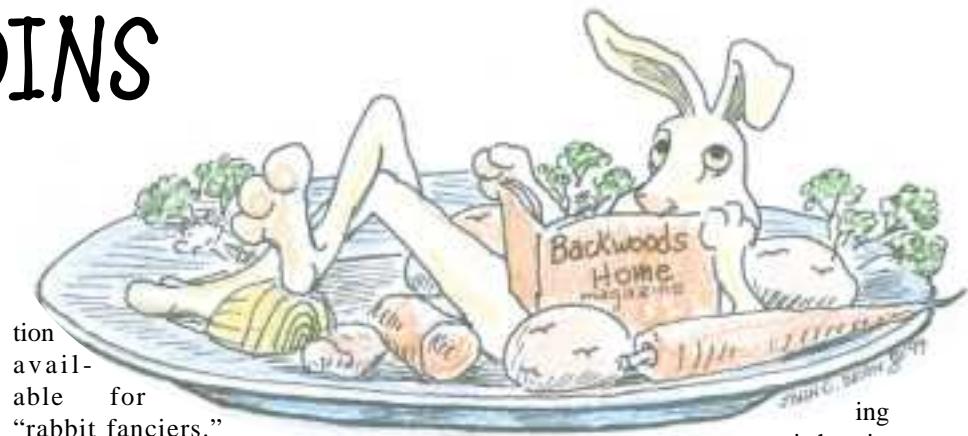
Which farm animal is best at converting pounds of feed to pounds of meat, produces the least wastage, the best fertilizer, produces the largest return per investment dollar with the least capital risk, and performs equally well in all environments, from central city to primitive backwoods? The answer, of course, is the lovable domestic rabbit.

A pair of rabbits can produce as much red meat in a year as an angus calf, while requiring about the same outlay of time and money as a pair of house cats. The meat tastes and looks a lot like chicken, is nearly as low in saturated fats, and can be prepared the same ways. But rabbits are quiet, require very little space, raise their own young, never need to be plucked or clipped, and make excellent pets. Ever try to housebreak a chicken? And rabbit manure can be applied directly to the vegetable garden without composting, with no danger of "burning" plants.

Rabbits are ideal for urbanites who plan to move to the country and want to learn how to raise their own meat. In many cities, rabbits are classed as pets and can be kept legally in zones where "farm animals" are forbidden. Even in areas where they are technically illegal, city health officials will often wink at a small rabbithry, as long as it is kept clean.

Choosing a breed

Neophyte rabbit breeders can be bewildered by the amount of informa-



tion available for "rabbit fanciers."

Although there are many different breeds, most rabbits fall into one of four easily recognizable types.

Dwarf types, such as the Dutch and Mini-lop, are used for pets and for competitive shows. They produce plenty of manure for a small garden, and cost virtually nothing to keep, but are too small to be useful for meat or fur. Even experienced does (females) may fail to provide enough milk for a typical litter of four to six small bunnies.

Giant breeds, such as the Welsh, are sometimes used for meat by breeders who want a large carcass, but they take much longer to grow to butchering size than other breeds. In fact, it costs nearly twice as much per pound of meat to raise giant breeds. There will be much more waste in a giant carcass, as the bones are heavier than in a normal size rabbit. Furs are generally of good quality. Litters are small, but the does are usually good mothers.

Commercial breeders usually prefer the all-white "**production**" breeds such as the California or New Zealand. The uniform-colored, pure white skins are preferred by buyers, who are usually planning to dye the fur anyway. These breeds have been selected for fast weight gain, large litter size, and hardiness. A typical production rabbit should grow to butcher-

ing weight in six to eight weeks and to breeding age in three months. Does usually kindle (birth) a litter of eight to twelve bunnies, and can usually nurse eight or ten of them.

Colored breeds are most often raised by 4-H club members, homesteaders, and other small-herd operators. Sizes vary, but most average just a bit smaller than the commercial breeds. Does make excellent mothers, raising average litters of six to ten. Bunnies reach butchering weight in about eight weeks and are very hardy. They make excellent pets, as they are smart and often have interesting color variations. Fur quality varies with the breed but is almost always soft and silky. Angora rabbits and satins, for example, are usually raised primarily for their fur, though the meat-producing ability and other qualities are indistinguishable from other, similar-sized breeds. Lop-eared rabbits of normal size can be considered a color breed in this respect, too, even if their fur happens to be white.

Color breeds generally cost less to buy than commercial rabbits and are the best for a beginner. If there is no breeder in your neighborhood, look in the classified section of your local newspaper, especially around Easter time, or at a local swap meet. Or contact the 4-H leader at the county

extension service of your state university. The extension agent may be listed under either county government or state university in your telephone directory. You can almost always find lots of rabbit breeders at your county or state fair, too.

Buying rabbits

In buying a meat rabbit, it is not necessary to get a pedigreed one. They cost more and may be no better meat producers than a "scrub" rabbit.

Tell the breeder that you are looking for a herd sire (male) and breeding doe. They need not be the same color or breed, but should be about the same size and should not be closely related to each other. In rabbits, especially, incest produces birth defects.

Ask the seller for a proven mother. First time mothers throw small litters, and may have no idea how to care for them. It may take two or even three litters before a new mom catches on. If a doe hasn't learned to raise babies by then, she probably never will.

Some breeders will sell such a cull, rather than butcher her themselves. There are no guarantees in the rabbit business, but most folks will admit that they are culling poor producers if you ask them directly. Many customers buy such rabbits to butcher, so make sure the owner knows you are looking for breeding stock.

Breeders will sometimes sell off a good mother if the herd is getting too big or if they are getting out of the rabbit business. But the most common reason for parting with a good breeding rabbit is age.

A doe more than two or three years old starts to slow down, producing litters of smaller and smaller size. It is uneconomical to keep such a doe in a large herd. But you can benefit from an experienced mother who will raise your next generation of does and teach them how to be good mothers. Such an older doe should cost no more than \$15 or \$20.

Ask about her age, average litter size, and recent litter sizes. Three or four years is old for a doe rabbit. Don't be too thrilled with reports of huge litter sizes. A doe who typically kindles twelve but can only raise eight is no bargain.

On the other hand, a doe who typically kindles and raises eight to ten, but is down to four or five per litter is nearly exhausted. She may never kindle again, but if she does, her daughters are likely to be good producers. If you do buy such a doe, don't pay more than a few dollars for her. Her owner has already got everything he can out of her and is only selling her so he won't have to butcher a pet himself.

When you go to buy your first rabbits, ask the breeder to show you how to pick them up and how to sex them. You can grab them by the scruff of the neck (never by the ears!), but there are other ways that are much more comfortable for the rabbit and less likely to get you scratched. Always wear long sleeves when handling rabbits. You can trim their claws with a dog claw trimmer, but you may get scratched anyway.

It is virtually impossible to describe how to sex a rabbit in words. Females have a clitoris that is nearly as big as the male's penis, and both are sheathed internally when not in use. Get someone to show you.

Equipment

To begin keeping rabbits you will need two cages right away and a third one very soon. Keep the male and female separated except when they are breeding. The father will kill his own babies and will greatly annoy a pregnant doe.

You only need one herd sire for up to five or six does. Mature bucks kept together will fight and may kill or castrate each other. Most bucks reach breeding age at around two months, does at three to four months.

Each cage must include a feeder and a water dish and some place for the rabbit to get off the wire floor. The mother's cage will need a nest box with sides at least six-inches high. You want the mother to be able to get in and out easily, but not the babies.

Newborn bunnies do not have enough fur on their bodies to keep warm, even in hot climates, and will die if they can crawl out of the nest box. The box should be large enough for the mother to lie down in but small enough to get in and out of the cage easily. Some homemade cages have built-in nest boxes. Most serious breeders prefer removable ones, as they are easier to keep clean.

If you make your own cages, you can use any kind of wire for the sides, as long as the holes are too small for the rabbits to get through. Even half-inch mesh chicken wire will work. But the floors must be made of $\frac{3}{8}$ -inch hardware cloth, with the sharp side down. Holes larger than that will catch the rabbits' feet, while smaller holes will not pass their stools.

It is very important to keep rabbits out of the wind. They can stand great extremes of cold if there is no breeze blowing on them. If you do not have a shed or building to keep them in, one alternative that works is to attach scraps of carpet to the sides of each cage so they hang all the way to the ground. Shingles or tar paper will protect the top of the cage. A good roof is important. Rabbit skin is porous and will not keep out water. It also will not keep water in. In hot weather, rabbits need access to good ventilation.

Feeders and food

Feeders for pelletized rabbit food are available at most farm-supply stores, and are a good investment. They can be installed through the wire, so they can be filled without opening the cage. Actually, rabbits will eat food pellets out of any kind of container. But they will chew plastic containers to bits in short order, and they will tip over any

container they can, spilling their food on the ground.

If you use homemade containers, make sure the rabbits cannot tip them over. Wire them to the cage or nail them to a piece of wood. Punch holes in the bottom of home-made feeders, to allow the "fines" to fall through. If they collect, the rabbits may inhale them while eating and contract lung problems.

An average size rabbit needs about a cup of alfalfa pellets or a "flake" of baled alfalfa hay a day. Rabbits are nocturnal, so do most of their eating at night. They can go for several days without food if they have to, but will die of thirst quickly because of their porous skin. They should always have water available, but especially in hot weather.

Rabbits love most raw vegetables and grains. They will even eat weeds from the garden. It's not a good idea to feed too much wet or green food to rabbits that are not used to it, though. Increase the amount gradually while watching for signs of diarrhea. They also need salt and minerals. Round mineral blocks, suitable for wiring to the side of the cage, are sold in pet stores and feed stores.

Rabbits love to chew on anything they can reach and can demolish a wood-frame cage. To keep them from such "cribbing," some breeders give their rabbits chunks of broken drywall to play with. Chewing the drywall keeps their teeth in good shape, and may provide a few minerals as well. It will not hurt them.

Water bottles with lick-type valves are great if you live in an area where it does not freeze in winter. Many breeders use stone crocks for rabbit waterers as the rabbits cannot chew them up or tip them over. But they get cold in winter and have to be removed to thaw out.

A cheap, easy compromise is to make water dishes out of cut-down #10 cans such as large coffee cans. If you cut down such a can, it is necessary to hammer over the raw edge so

the rabbits don't cut themselves. Punch or drill a couple of holes near the top and wire the can to the cage, so the rabbits can't tip it over or pull it to the back of the cage. Tin can waterers are easily thawed by running the can under hot water. Or you can carry hot water to the barn, pour some in the can, wait a few minutes, and bang out the ice.

Breeding

Put the buck (male) in with the doe for a few minutes and watch what happens. If she is in heat, she will soon stand still and allow him to mate. If she fights with him, or persists in running away, she is not ready.

Put him in her cage for a few minutes every day until she allows him to breed, and record the date. Twenty-eight days later she should kindle. Protect her from anything that might frighten her, such as the immediate presence of a dog or cat or loud, sudden noises. Rabbits have the ability to resorb their babies, right up to the time of birth, if they become frightened.

Put the nest box in the mother's cage three or four days early to give her time to get used to it. Twenty-four hours before birth, the doe will pull out large amounts of her soft underfur to line the nest. If you think she is not pulling enough, give her some straw.

Leave the babies alone for the first day or two. Rabbits have exquisitely sensitive noses and may reject their babies if they have even a whiff of human scent on them. If you must handle the newborns, put a

small dab of Mentholatum® on the mother's nose. By the time she gets it off, the human scent will have faded.

Remove any babies that die or the mother may eat them. If a doe kindles more babies than she can feed, you may be able to foster them on another doe who kindled at about the same time. Use the Mentholatum trick to fool the new mother, too, and keep a sharp watch, as she may kill them anyway.

Feed pregnant and nursing does all that they will eat. After the first two days, it's important to pet the bunnies every day. Studies have shown that rabbits actually grow significantly faster if they are petted. This is a great job for children, as long as they are taught not to let the rabbits escape.

Some breeders feed their rabbits a few bits of Calf-Manna, a dietary supplement for cattle. Rabbits think it's candy. If you use Calf-Manna, never give more than three or four pellets

Waiting for Something to Happen

There was the dent in the fender of the '49 Merc
That made it look cockeyed at night;
One headlight on the road,
The other up in the branches as we whizzed by.
My friend was eighteen and owned the car;
I was sixteen and brewed beer in a corner of our barn.
We cruised the small towns
And backwoods of southern New Hampshire
With the windows down and the radio wailing—
It was 1960, our whole lives were ahead of us,
But we were waiting for something to happen.
We always drank what we didn't sell
(Fifty cents a quart—for gas and cigarettes).
But around eleven
I was usually in the headlights throwing up,
My friend behind the wheel, laughing and jeering,
And I'd swear I'd never get drunk again.
But we'd be back out the next night,
A bag of bottles in back,
Selling what we could,
Passing an open back and forth,
And waiting for something to happen.

—John Silveira
Ojai, CA

per day. More than that can cause fatal attacks of gas.

Once they have tasted Calf-Manna, even shy bunnies will take it directly from your hand. Such trust can be a great help at butchering time, or when a rabbit has escaped. Calf-Manna is expensive, but a bag will last even a large herd a year or more.

When the babies are old enough to leave and enter the nest by themselves, and are eating and drinking on their own, it is time to move them to their own cage. It's okay to keep several bunnies in one cage, as long as they have enough room to hop around, but be sure to separate the females from the males when they're a month old or so. The breeding ages mentioned above are averages. Some individuals may breed at a much younger age. It's horrible to butcher a female "fryer," only to find six or seven dying fetuses.

Slaughtering

The only unpleasant part of keeping rabbits is killing and butchering them. Even this isn't as bad as it might be, as they rarely put up a fuss, and are easier to skin than any other domestic animal. Contrary to popular belief, rabbits do have voices and may scream when you kill them, but this is extremely rare. In 25 years of rabbit keeping, I have only heard a rabbit scream twice.

Butchering equipment for rabbits is very simple. I use an old hammer handle, an empty bucket, a very sharp paring knife, and a clean pair of pruning scissors or general-purpose kitchen shears. I could do without the shears, but they make skinning and butchering go much faster. I wear old clothes that I don't mind getting bloody.

I also use a homemade gambrel-stick to hang the rabbit on for skinning. This is just a piece of wood with a couple of 16d nails hammered all the way through, about a foot apart. Nail the stick to a tree with the "hook"

nails poking out, and bent up a little to hold the rabbit. I know other breeders who just lay the dead rabbit on the kitchen table, but I find skinning easier with the rabbit hanging by the hind feet.

There is a method for quickly and easily killing young rabbits of fryer size by dislocating the head with the bare hands. This method is the most humane, but is not easy to learn, and must be demonstrated by someone skilled in the technique. If you know a breeder who has the skill, get him to teach you. This only works well with young rabbits anyway.

For older rabbits, use the tried-and-true method of stunning the rabbit and slitting its throat.

The best way is to sit the rabbit on a tree stump or chopping block, pet it until it relaxes, and hit it hard in the back of the head, just above the neck, with a hammer handle, piece of iron pipe, etc. That's why this kind of a blow is called a "rabbit punch." The rabbit will be stunned, and may shake and shiver, but will not object while you chop off its head with a hatchet, or just hang it up and slit its throat with a sharp knife.

Skinning

To skin a rabbit, bend one hind foot to expose the Achilles tendon and poke one of the hook nails of the gambrel-stick through the skin, between the tendon and the bone. Repeat with the other foot so the carcass is hanging facing out. Cut off the head, if you haven't done so already, and drop into the bucket. Some people feed rabbit heads to their dogs. I feel this only trains the dogs to kill rabbits, so I throw the heads away.

Cut the skin all the way around one hind leg, just below the foot, being careful not to cut the tendon. Repeat with the other hind foot, then slit the skin down the "inseams" of both legs. Join the cuts in front of the sex organs.

Pull the skin off the legs. Force your hand between the skin and the muscle

if need be in order to make the skin come off. Work your hands around to the back, until they meet behind the tail.

Leaving the skin and fur on the tail, cut the rest of the skin away from the tail. The carcass should now appear to be wearing a long dress open at the knees. Remove the dress by turning it inside out. You may have to slice carefully between skin and muscles in a few places, but unless the rabbit is very old it should come off pretty easily with a steady, downward pull. Rabbit skin tears easily, so be careful.

When you reach the arms and neck, you will have to work the skin with your fingers to get it over the arms and the stump of the neck. It will look confusing. Just keep pulling and working with the fingers, alternately, until the skin is completely inside out, down to the wrists.

Cut the forepaws completely off at the wrist, allowing them to stay with the skin. The rabbit should now be entirely free of skin, except for the hind feet, tail, and genitals.

Using pruning shears or kitchen scissors, cut through the tail where it joins the body. Slide one blade of the shears between the anus and the pelvic bone and cut through the front of the pelvis on each side of the anus. Hold onto the tail so the genitals and anus don't slip inside.

Place the scrap bucket below the carcass and slit the membrane holding the guts in, all the way down the front. Using the tail for a handle, carefully work the anus through the opening you made in the pelvis and allow the guts to fall into the bucket. Be very careful not to prick the bladder or you'll get urine all over the meat and maybe all over you.

If you do, don't panic. Rabbit pee won't hurt you. Just wash it off the meat right away and don't tell anyone. Urine is sterile when it comes out of the bladder and will not contaminate the meat, if you wash it off right away.

The rest of the guts will fall out of the carcass down to the level of the diaphragm. Pull the diaphragm out of the carcass, strip out the large vein along the backbone, and work the lungs, heart, and the windpipe free. It comes out easier if you use the shears to cut the ribs along the breastbone.

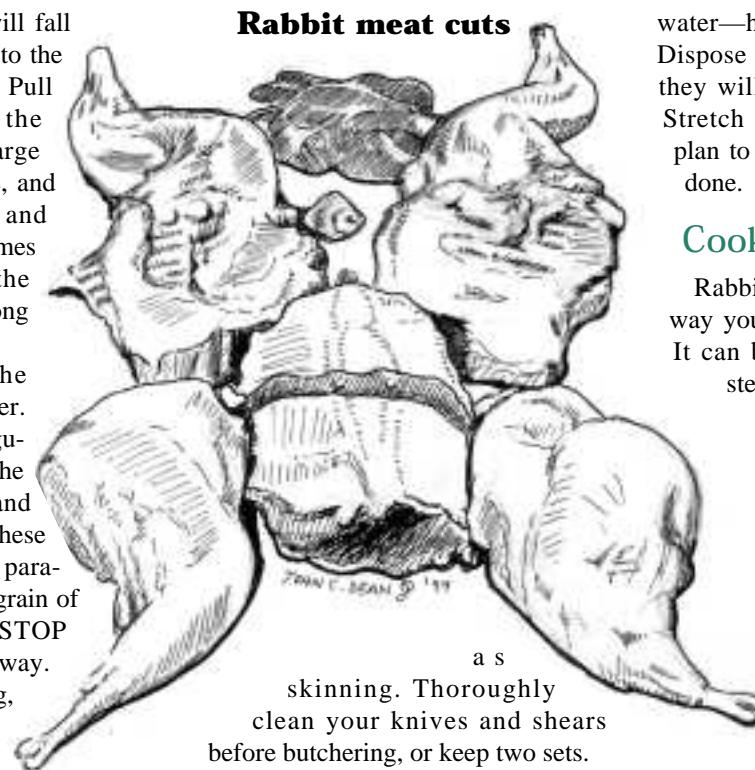
While you've got the guts handy, find the liver. It's a dark, reddish, irregularly shaped organ near the bladder. Slice it open and check for liver flukes. These are small white wormy parasites about the size of a grain of rice. If you see them, STOP and throw the carcass away. Do not feed it to the dog, either.

Liver flukes are about the only disease people can get from rabbits. Dogs and cats can get them too. In fact, dogs and cats are the most common source of infestation for rabbits. The flukes don't seem to bother dogs or cats much, but they will eventually kill rabbits. There are other diseases rabbits can get from dogs and cats, and they are another reason to keep pets away from your rabbitry.

Remove the carcass from the gambrel-hooks, cut off the hind feet, and you're ready to clean and cut up the meat. Soak the entire carcass in cold water for 10 or 15 minutes to remove any trace of blood. Hand pick the entire carcass to remove every hair.

Butchering

Most mammals are built on the same plan, so if you know how to butcher one kind, you can pretty well butcher any other. Nevertheless, rabbits are much smaller than other farm animals, so you won't be worrying about steaks and chops. It's more like cutting up a chicken. I make good use of the kitchen shears in butchering, as well



Rabbit meat cuts

skinning. Thoroughly clean your knives and shears before butchering, or keep two sets.

Start by removing the neck and the arms. Cut through the meat and bone of the neck with the shears. If there are any bruised spots left from killing, discard them. Cut the thin meat around the shoulder blades and the arms come free. Cut off the drumsticks by slicing down through the meat all around the hip joint. When the joint is exposed, either break it or cut through it.

Remove the pelvis by cutting down to any vertebral joint below the ribs.

Cut the meat on either side of the spine as well. Turn the carcass over and cut to the same joint on the other side, then break the joint by hand.

Cut the ribs along the spine. If the rabbit is a large one, cut and break the spine in the middle of the remaining piece as well. If the rabbit is small, this is not necessary. Make sure there is no dried blood or hair on the meat anywhere, rewashing if necessary. Freeze in convenient-size packages or cook and serve as is. Rabbit meat is naturally tender and does not need to be hung.

Clean-up is not difficult. Wash your tools, hands, and clothes in cold

water—hot water will set the blood. Dispose of the guts and head where they will not attract wild predators. Stretch and scrape the skin, if you plan to keep it or sell it, and you're done.

Cooking

Rabbit meat can be prepared any way you can cook a cut-up chicken. It can be barbecued, fried, baked, stewed, roasted, etc. But rabbit does not taste or cook exactly like chicken, and there are other recipes that work better for rabbit.

Europeans eat a lot more rabbit than Americans do and there are special rabbit recipes in the national cuisines of most European countries. Just about any good German cookbook will contain a recipe for hasenpfeffer, a marinated rabbit dish, for example. Many of these special rabbit recipes are quite complicated. Δ

Rabbit in beer marinade

Here's a simple one that my mother used to make:

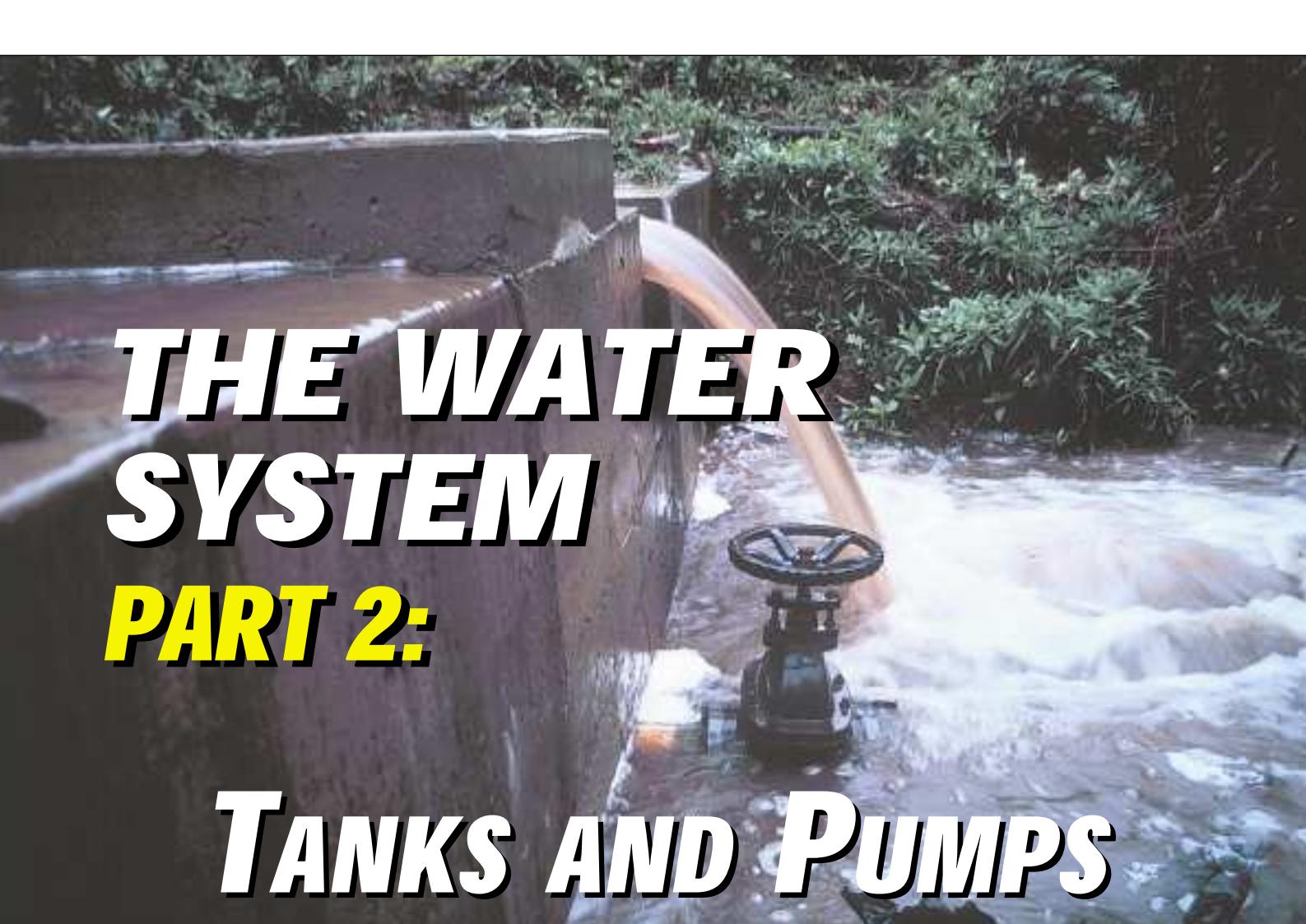
- 1 or more rabbits, cut up.
- 1 can of beer per rabbit.
- (Cheap beer works as well as fancy imported.)
- 1 can of cream of asparagus soup concentrate or white sauce.

Marinate the rabbit in beer overnight, in the refrigerator, in a covered, non-metallic container.

Drain, place in casserole dish, and spread with soup concentrate.

Bake like poultry, sprinkling occasionally with left-over beer marinade.

Unlike poultry, it is safe to eat rabbit cooked rare, so do not over-cook.



THE WATER SYSTEM

PART 2:

TANKS AND PUMPS

BY MICHAEL HACKLEMAN

It is versatility that ensures a robust and reliable water system. In the last issue (July/August 1999, Issue 58) I detailed potential sources of water—i.e., rivers and streams, springs, lakes and ponds, shallow wells, deep wells, and rainfall—and the factors a landowner may use to evaluate their potential of development for use in a water system. Then we examined potential energy sources—human, wind, water, engines, electric motors, and combinations for the processes of extraction, transport, storage, and pressurization of water in systems. Finally, I detailed the energy requirements of lifting and pumping water and those factors related to the sizing of water storage for normal usage,

source variance, gravity flow and pressurization, and emergencies like fire fighting and blackouts.

In this issue, we will continue with a closer look at those factors related to selecting and sizing the hardware of the water system, particularly tanks and pumps. Next, we will examine several examples of water systems and the accessories needed to complete any system.

Tanks

Tanks are one of the best ways of storing water. The relatively high cost of storage by this means (compared with ponds or reservoirs) is often justified in light of convenience, better protection against contamination, effective shielding from sunlight, and

the ease of determining the precise amount of water that has been stored.

Tanks come in all shapes, sizes, and materials. Four basic materials are used in tanks: wood, metal, plastic and concrete.

Wood tanks: One of the oldest materials used for tanks is wood. Typically these tanks are round-sided, flat-bottomed, and with a top that's open, flat, or sometimes fluted to shed precipitation, airborne dust, and other debris.

Not just any wood will do for water tanks. Typically, successful ones are fabricated from redwood, mahogany, or white oak. These woods, after an initial leaching of acids and resins, offer a sterile environment when in contact with water. Water in contact with other woods will warp or rot

SIDE BAR A: TYPES OF METAL TANKS

Welded: Welded tanks are used for smaller capacities than bolted tanks. Thicker steel is arced to the desired shape and welded to similar sheets. The component parts of the tank are welded together into a rigid tank. This type of tank may be easily manufactured in a shop and transported to the usage site (**Fig. 1**). The limiting factor on size for this type is the carrying capacity of the transport system used to ferry the tank from the shop to the site. Of course, the shaped steel sheets could be transported "as is" along with the welding equipment to put it all together on-site.

Bolted: Another possibility is to use a steel tank designed to be bolted together; this eliminates the need for any on-site welding while solving the transport problem for thick-wall tanks of immense size. Tar or another petroleum-base sealant is sandwiched between the bolted sheets during assembly to prevent water loss.

Figure 1: Welded tanks are transported to the storage site.



them, leach undesirable chemicals and resins into the water, or promote the growth of bacteria and algae in the water supply.

Just as redwood or oak swells in the presence of water, it shrinks in its absence. Therefore any portion of the wood in a tank that is not covered with water will, after a few days, dry out and may lose its water-sealing function. In view of this, tanks constructed of either oak or redwood should be kept filled. Lacking this, they should be sprayed with water several times a day or excused from verbal abuse when they do leak.

Other woods are used in the construction of tanks. However, they must be treated so that, in effect, the water

does not come into direct contact with the wood itself. Varnishes, resins, fiberglass, tar, or other coatings will be necessary. Or the water may actually be enclosed in some type of plastic or rubber bladder inserted in the tank.

Metal tanks: Water storage tanks may also be made of metal. This is usually sheet steel, and even very large tanks may have surprisingly thin walls. Since steel exposed to water rusts, it must somehow be protected. Paint, tar, and galvanizing are three common coatings.

Steel tanks are characterized by one of three techniques used to secure the metal sheets together in tank construction. They may be welded, bolted, or soldered. (**Sidebar A**)

are also used to secure the sheets at the edges, along with crimping.

The thinness of steel or tin in galvanized sheet tanks is sometimes a disadvantage. In coastal areas, for example, the effects of the salt-laden air are all too evident.

While welded or bolted steel tanks may be transported about, the thin galvanized tin or steel tank usually can't survive transportation from one place to another or rough handling in any form. Out of necessity, then, they are constructed on-site.

Plastic tanks: The high price of steel has prompted the production of plastic tanks in the 400 to 2,000-gallon range for water storage. Usually pale yellow or black and cylindrical, they have molded fittings for the inlet and outlet, and an access hatch in the top. These may be purchased and delivered to the water site.

Concrete Tanks: Concrete is also used. The basic setup is a poured slab for the base of the tank and poured, formed walls. Since this is similar to constructing a building's foundation, the resulting tank is square or rectangular sized. Or if a round tank is preferred, a slip form constructed in the shape of an arc can circumvent the many difficulties in producing a con-

SIDE BAR B: THREE METHODS OF TANK SUPPORT

Banding: A band is a strong, continuous material that encircles the tank. It is demonstrated in banded wood barrels. The operating principle of banding is simple. Pressure is identical in all directions; therefore, the outward pressure of water at any point is opposed by the band's inward pressure on the tank wall directly opposite that side of the tank. Obviously the band material is under heavy tension and must be strong enough to withstand shear.

Bands work on circular tanks only. Square or rectangular tanks may also be banded, but the only points where the bands are really working is at the corners. The outward pressure at any point between the corners works perpendicularly to the tensioned band and is, therefore, rather ineffective. The weakest point is the midpoint between the tank's corners. The walls will bulge outward at these points.

Buttressing: One solution to tank support involves buttressing. It takes two forms. One is an external, angled support (**Fig. 2**). Accordingly, if one buttress is used, it should be placed at the midpoint between the corners of the tank on each side. Long tanks may require several buttresses on each side.

A second buttress solution is to use an arced section of material along each side and to band it as you would a perfectly round tank. Either a square or rectangular-sided tank will be best supported if the selected arc describes a full circle.

Burial: Concrete, masonry, and concrete block tanks may also be supported by burial. There are two ways to do this. One is to dig the hole and insert a ready-built tank. The other is to dig the hole and build the tank in it.

This is no problem with standard concrete block or masonry construction. A poured-concrete wall will

require forms. Putting them in is easy, but extracting the exterior portion of the form (facing the pit's walls) afterward may not be. Nevertheless, it should be removed. The wood could swell enough during the wetter season to crack the concrete wall.

There's a temptation simply to "form up" the inside surface of the tank and use the pit's wall in place of the exterior form. The penalty for such laziness is the cost of all that extra concrete. Also, concrete is heavy—a cubic yard weighs four tons—so it will readily compress the earth, particularly when it's stacked up for four to eight feet. Finally, concrete doesn't cure against dirt as nicely as it does against forms, which means that it won't be as strong.

Cisterns or reservoirs built into a slope may have a good percentage of the complete tank showing and, therefore, unsupported. Banding or buttressing will not be required if some of the leftover dirt is shoved up against the wall. The result is a "bermed" wall. Since this technique will work, no tank need be completely buried. While retaining the best aspects of a buried tank, a partially buried tank saves on cost, time, and materials and solves the problem of what to do with all that "extra" dirt displaced by the tank.

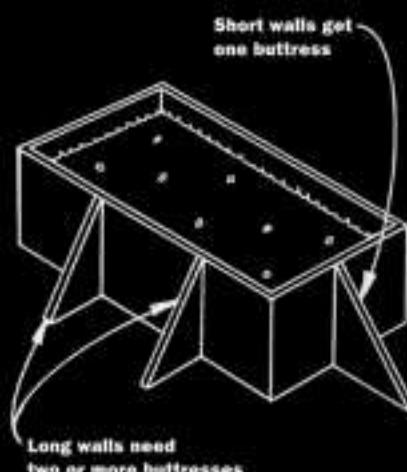


Figure 2: Buttresses provide additional structural support.

toured form. The use of rebar (a reinforcing bar used in standard concrete construction) is critical for either type to offset the water's weight and pressure when the tank is filled. A larger square or rectangular tank, even with internal rebar, will need additional external bracing to maintain structural integrity in use. (**Sidebar B**)

Bottom support of tanks: Irrespective of the type of tank used, it must have adequate support from below. Water hits the scale at 8.33 pounds per gallon. A thousand gal-

lons, then, weighs over 8,330 pounds. At 2,000 pounds per ton, that's in excess of 4 tons. A 4000-gallon tank, then, holds a whopping 16 tons of water and that doesn't include the weight of the tank! The point? Never place a tank on rough ground or soft fill. If a tall and slim tank is desired over one that's short and squat, the problem becomes more acute. An analysis of the soil density may be needed to assure that it will not settle.

Wood tanks placed on bare earth will rot. Steel tanks (even galvanized)

placed on bare earth will rust. How fast is anyone's guess, and it doesn't really matter. Don't do it! Large tanks are usually set on a bed of gravel over leveled earth. This takes care of the rust or rot problem—precipitation and condensation are drained away. This also lends a self-leveling feature. Use sand over gravel when the tank wall is thin plastic or metal. Otherwise, the bottom will be deformed or punctured by the smallest object when the tank is filled.



Wood and steel tanks may also get some help from treated wood beams. Old railroad ties spaced evenly over leveled ground will do the job. A raised platform also helps to lessen the probability of rot or rust in wet climates. Where it is desirable to use gravity flow and/or pressurization—but a higher elevation than the usage site is not available—the platform may be extended upward the needed distance to accomplish either or both. Obviously, this has a limiting effect on the type of tank used. A tank that can be constructed piece by piece on the tower will be preferable to one that must be raised to the top. Another drawback is that tank size is restricted. The tower, including footings, tower legs, and cross bracing must be sized to evenly support the tank's bottom area, its weight, and the weight of the water it can hold. Add in the extra problems of wind pressure on both tower and tank and any propensity for the ground to move through settling or earth tremors, and both the logistics and expenses are formidable. Nevertheless, tower raising can be a lot of fun (**Fig. 3**) And your tower might even become a house (**Fig. 4**).

Tank coatings: Redwood, mahogany, and white oak tanks have a built-in coating that prevents leakage,

the formation of organic growths, and deterioration of the wood itself from rot. Water loss is prevented because it is the nature of these specific woods to swell and seal the tank. Newly constructed tanks, then, will leak like the proverbial sieve. For this reason, before the first filling, water is sprayed about the interior, wetting the wood uniformly to initiate the swelling and avoid the otherwise lengthy process of filling the tank. Another idiosyncrasy of these specific woods is that most of the harmful resins are leached from the wood during the initial period of use and will thereafter remain inert.

The scarcity and high demand for these woods make them prohibitively expensive for large tanks. However, other woods—pine, fir, oak—may suffice. But while these substitutes do give the nice wood appearance and provide the necessary structural support, they do not exhibit the self-sealing and preserving qualities of redwood. Moreover, once the resins are leached from the wood, fungus growth will occur.

For these reasons, the inside of tanks constructed of other types of wood must be sealed. Sealers and paint will counteract many of these problems, but preventing leakage is the tough

Figure 3: (Left) A tower will provide gravity pressurization.

Figure 4: (Below) A water tower can be converted into a house.



one. So, a hard, completely watertight coating is called for, and that narrows the possibilities to some kind of epoxy, resin, or liner. Fiberglass is the usual choice because it may be used in conjunction with fiberglass cloth to make a tightly bonded, impenetrable finish.

In the presence of water, steel rusts. So, irrespective of the type of steel tank—whether soldered, welded, or bolted—a first requirement of a coating is to keep the water away from the metal. A waterproof paint or tarlike sealant is the primary choice. Pick one that prevents the growth of algae. Be wary—select a coating that meets your own standards in what you're willing to allow in your water in the way of chemicals, trace minerals, and elements.

Provided that the solder or weld joints are good ones, steel tanks don't need leakage protection. The application of any type of paint or epoxy over these surfaces if they're even slightly encrusted with rust, dirt, or oil is cosmetic only. Don't do it! Wire-brush or sand off the rust, wet-mop the dust,

and use something akin to alcohol or lacquer thinner to remove any trace of oil or grease prior to the application of a primer. Avoid the use of any rust-inhibiting primers not specifically approved for potable water. Fortunately, red lead primer is no longer available, but even zinc chromate primer would not be a good addition to drinking water. These are strictly weatherizing primers, for external use only. Apply the epoxy paint or other good water-base paint in one or two coats. Redo as required. Access to the tank will assure sufficient warning when a recoating is indicated.

Galvanized sheeting that is soldered for waterproofing should also receive a coating of some type. It's not usually done—the solder takes care of leaks, and the galvanizing takes care of the rust protection. However, long-term exposure of both solder and galvanizing to water, particularly soft water, can be dangerous. The water tends to leach lead from the solder—solder is lead and tin in various mixes, usually fifty-fifty. The water will leach both lead and cadmium from the galvanized coating. If

you decide to cover the galvanizing with a coating that reduces this risk, choose it carefully. Many types of paint or epoxy will not adhere to galvanizing, and fewer still will meet potable water standards.

Concrete tanks will need a coating to prevent the escape of water and the formation of organic growths. A standard coating technique is that used for swimming pools: a mudlike, cement-rich plaster applied over the cured concrete, inside or out. An alternative is to use one of the newer concrete sealants such as cement paint or bituminous mastic. Both ways are expensive. Cement paint requires specialized labor in applying the coating. With mastic, the sealant itself is expensive.

Pumps

There are three basic types of pumps that may be used in a water system to extract water from a source and deliver it to storage or immediate use. These are the piston pump, the centrifugal pump, and the hydraulic ram.

Piston pump: The piston pump, also known as the positive displacement pump, sees wide uses in water systems. It works on the reciprocating principle, or an up-and-down or back-and-forth movement. More specifically, a piston moves inside a cylinder (**Fig. 5**), drawing water through an intake check valve on one part of a stroke and pushing it out through an outlet check valve on the second part of the stroke. Irrespective of the outlet or inlet water pressures, the same amount of water is pumped during each stroke; hence the term “positive displacement.” This no-nonsense action also enables the unit to pump air efficiently. The air compressor and tire pump are both piston pumps. The piston pump can suck water up from as far as 25 feet below the pump.

There are two common configurations of the piston pump in water systems. In the first setup, the pump

mechanism and its power unit—the motor or engine that drives it—sit atop a shallow well with a tail pipe reaching down below the water level. As long as this distance is not greater than about 25 feet, the pump’s action will suck water up to the pump and then push it onward to usage or storage.

The second configuration handles well depths where the water level is more than 25 feet below the ground. The power unit and pump are separated. The power unit operates a converter—a device that translates the rotary motion of the power unit into the reciprocating motion needed in the pump mechanism—at the wellhead (ground level). Through a section of rigid rod, usually referred to as “sucker rod,” this power is transferred to the piston pump mechanism situated deep in the well. The deeper the well, the longer the sucker rod. Since the water must be pumped to the surface through a pipe anyway, the sucker rod is designed to operate the piston pump from inside the delivery pipe, sharing this space with the upward-moving water.

This arrangement seems odd, but in reality it is both simple and straightforward. It has two additional benefits related to servicing the pump and using a tailpipe. (**Sidebar C**)

There is a limit to the maximum number of strokes that this type of pump can withstand. A stroke is one cycle consisting of one up-and-down movement of the piston in the cylinder. This pump has a limit of 30-45 strokes per minute. In consequence, a system that uses a 6-inch stroke (total distance of movement) and a 3-inch cylinder (the biggest available) can supply up to 7.7 gallons per minute. (**Fig. 6**)

This is a low rate compared with other pump types such as the submersible centrifugal pump, and will barely cover most household needs directly. For this reason, the deep-well piston pump is utilized primarily in

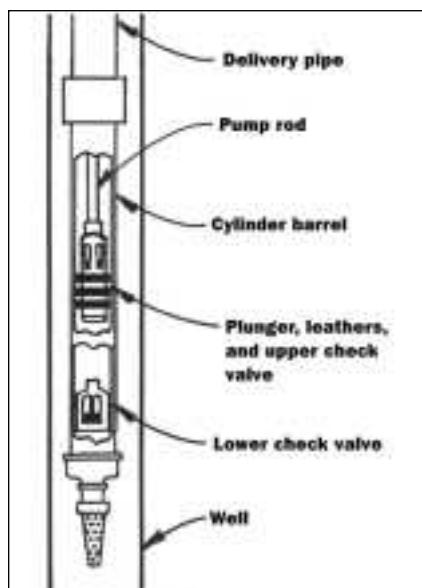


Figure 5: A deep well piston pump and cylinder.

Figure 6: DEEP-WELL PISTON PUMP RATINGS

GPH	Discharge Rate*	Cylinder Size (I.D.) in inches	Electric Motor Size		
			1/3 HP	Maximum Lift in Feet 1/2HP	2/3HP
146	2.4	1-11/16	228	336	513
157	2.6	1-3/4	212	318	477
180	3.0	1-7/8	186	277	416
205	3.4	2	162	244	366
260	4.3	2-1/4	128	192	289
321	5.4	2-3/4	104	156	234
389	6.5	2-	85	128	192
463	7.7	3	72	108	162

* Assumes 6-inch stroke and 42 strokes per minute.

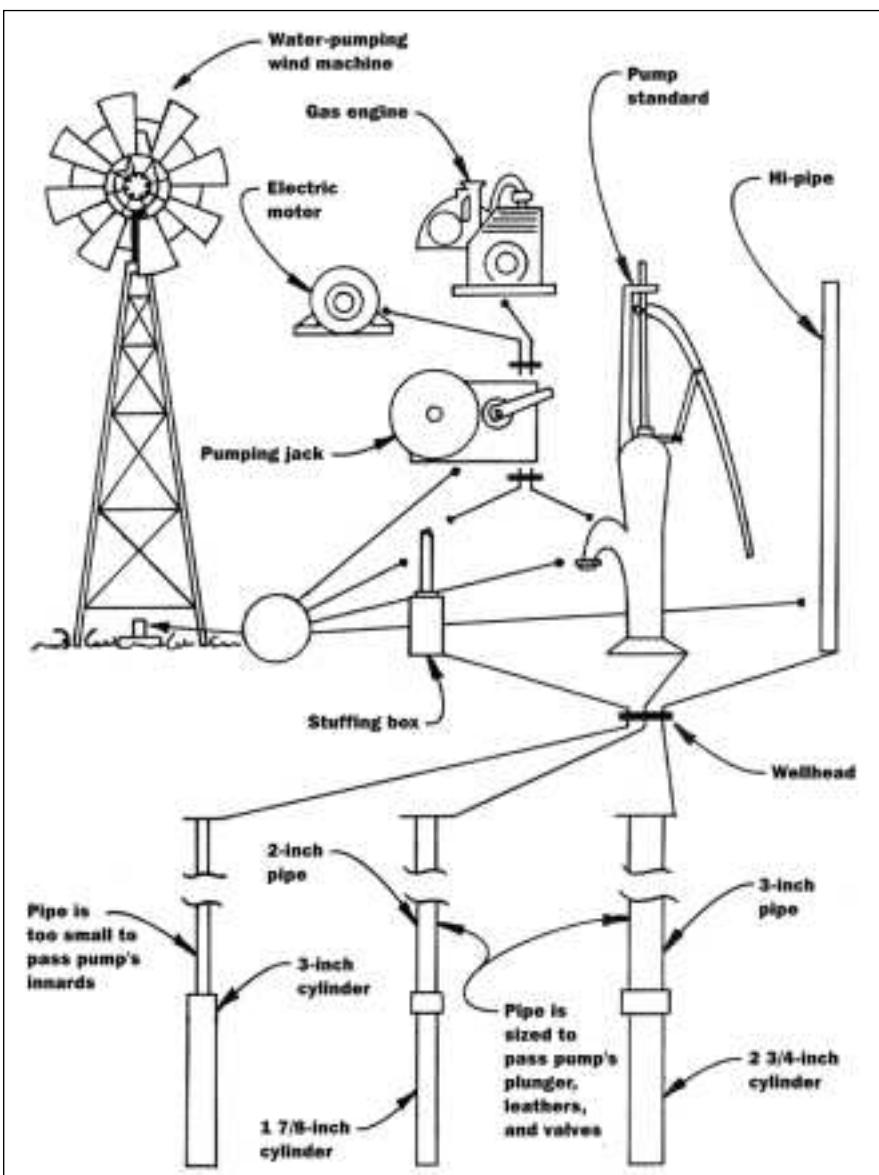


Figure 7: There are multiple ways to power a deep well piston pump.

the “store” type of water system where its only job is to pump water to storage. Hence, transporting and pressurizing water for usage is left to another means, i.e. gravity.

The deep or shallow well pump mechanism may be operated in four different ways. (Fig. 7) Pumping by hand is accomplished through use of the pump standard. An electric motor will drive the pumping jack—a unit that bolts to the pump standard—to operate the pump’s sucker rod. A small gasoline engine will also operate the pumping jack. Finally, a wind machine will connect directly to the sucker rod to operate the pump. Frequently two or more of these pumping methods are combined, since the equipment is designed to accommodate multiple energy sources. (Fig. 8)

Centrifugal pump: The centrifugal pump works on the same principle as a rock on a string that you swing around your body. The rock wants to travel in a direct line, but the string prevents it from doing this. If, instead, you held a bottle with one end of a long section of rubber tubing secured through its cap and whipped the hose around in a tight circle, the water in the bottle would travel down the tubing. That’s centrifugal pumping.

The centrifugal pump built for a water system uses impellers instead of tubing and is much more compact. Coupled to a high-speed electric motor, it is capable of delivering water at a very high rate.

A single set of impellers in a centrifugal pump can pump against only so much pressure (head). Hence, the pumping rate drops off as the pumping head increases. This limitation is alleviated in design by stacking individual impeller sections on top of one another, each with an outlet connected to the inlet of the stage above it and its own inlet derived from the outlet of the stage below. Standard centrifugal submersibles are available with as few as seven stages and as many as forty-

SIDE BAR C: FEATURES OF THE DEEP WELL PISTON PUMP

An above-ground positioning of well pumps is always preferable for the convenience it affords in servicing the equipment. However, with the deep well piston pump, careful selection of components will still allow the removal of the entire pump mechanism, including valves and leathers—the only section of the pump mechanism that is subject to wear—up through its delivery pipe for servicing without hassling with the pipe and cylinder itself. This is a nice bonus. All that 2-inch galvanized pipe is heavy, and removing it would add many hours and considerably more equipment to an otherwise fast and easy overhaul.

This magic works if the cylinder diameter is 1-7/8 inch and the delivery pipe is of 2-inch diameter. If a larger cylinder size is needed (or dictated) to increase the pumping rate or pump depth, there are two options. One is to install a pipe size larger than 2 inches to retain the servicing capability. The other is to keep the pipe size at 2 inches (or smaller) and lose the option of removing the wearable portions of the pump up through the pipe when servicing is needed.

A second benefit stems from the piston pump's ability to pump air and therefore suck water. With the addition of a tail pipe, the pump's reach for water is extended to 15 to 20 feet below the pump. This saves just this much expensive sucker rod and galvanized pipe. In addition, maximum use of the well's depth is assured. No type of pump can be placed close to the bottom of a well without sucking in a lot of sediment and doing itself irreparable harm. In this scenario, the bottom of the tail pipe can sit closer to the bottom of the well while the pump itself is safely 15-20 feet above it.

five stages, depending on the final in-well depth, total pumping head, pumping rate, and delivery pressure.

Note the difference in pumping rates of the centrifugal pump (**Fig. 9**) compared with the deep-well piston pump (**Fig. 6**) for equivalent motor horsepower, pumping head, and pressure delivery.

With such a difference in performance, why then isn't the piston pump retired to dusty shelves alongside other antiques? A major reason is that the centrifugal pump can't suck or pump air. For this reasons, it must be submerged. The water level in a well

drops as the water is pumped from it. This is called "drawdown." At the high rates the centrifugal pump will extract water, it must be located deep enough in the well so that the point of greatest drawdown will not fall below its inlet.

This is no particular problem for the pump mechanism, but it does raise a few engineering nightmares for the power unit. Since both operate in a rotary fashion, coupling the two units together over a distance of more than a few feet is difficult. At the kind of rpm the pump works best, there's also a real problem with balance.



Figure 8: A pump jack mounted on a pump standard offers hand and powered pumping.

There are several solutions to this problem. In shallow wells, the pump may be mounted over the wellhead. Equipped with an injector mechanism, it pumps a high-velocity stream of water upward through a tail pipe. Well water is caught up in the flow and rises to the sump, where the centrifugal pump takes over. In this instance, the jet pump can exceed the performance of a piston pump of equal specifications if the water level is only a few feet below the pump. Still, it falls off rapidly as the distance approaches the suction limit of the piston pump.

A more commonplace solution joins the pump to the motor in a single, watertight housing. This is the highly acclaimed submersible centrifugal pump. By simply attaching a 1-inch

FIGURE 9: CENTRIFUGAL PUMP RATINGS

Electric	No. of	Total Pumping Head									
		20	40	60	80	100	120	140	160	180	200
1/3HP	10	745/12.4	690/11.5	620/10.3	535/8.9	430/7.2	285/4.8	65/1.1	-	-	-
1/2HP	13	820/13.7	775/12.9	735/12.3	690/11.5	635/10.6	580/9.7	505/8.4	415/6.9	300/5	125/2.1
3/4HP	18	870/14.5	845/14.0	820/13.7	795/13.3	760/12.7	730/12.2	700/11.7	665/11.1	630/10.5	585/9.8

* Assumes 30 psi at delivery point.



Figure 10: A hydraulic ram is a simple, water-powered pump.

plastic pipe (type PE), the pump may be lowered by its delivery pipe and the protruding electrical wires to any desired depth. Pretty simple!

Hydraulic ram: While different in appearance and operation from other waterwheels or turbines, the hydraulic ram is a water-powered device. (**Fig. 10**) It has one function: to pump water.

How does it work? The ram uses the energy of moving water to pump a small portion of that water to a higher point. It starts when we let water flow through a drive pipe into the ram and suddenly shut it off. Water, once moving, doesn't like stopping so abruptly, so it piles up. And because it's virtually incompressible, it builds up pressure. If we put a check valve in the chamber, the pressure will pop it open, moving a small amount of water into the vertical pipe beyond. Once the penned water has spent its pressure, the check valve closes and the flow automatically resumes. Preset adjustments again shut off the flow, and the pressurized water acts again on the check valve. The water in the pipe behind the check valve climbs higher and higher with each cycle. You can attach extra sections of pipe until the suddenly blocked water does not create a pressure sufficient to overcome

the weight of the water in the delivery pipe and deliver any more water through the check valve. That's the limit of the ram, and it can be increased beyond that point only with a larger inflow of water (larger diameter of drive pipe) or a higher pressure of incoming water (greater initial drive head).

Theoretically, the ram pumps $\frac{1}{10}$ of the water 10 times as high, $\frac{1}{5}$ of it 5 times as high, and so on. As we might suspect, in practice the results are much lower because of friction in the working parts such as valves and inlet and delivery pipes. Nevertheless, the results are impressive and beneficial if you want to fill a reservoir or get water to your homesite on the hill from the stream in the canyon below. If you have gross amounts of water in the stream or river, you can use the hydraulic ram to pump water to an elevation and then let it drop into a water turbine that's back down the hill, thereby producing electricity. Sort of roundabout, but undeniably practical under the right conditions.

The standard ram is a single-acting unit. It pumps the water that powers it. A double-acting ram will pump a different source of water than the one which provides the pumping action. In this way, a stream may operate a

hydraulic ram to pump water from a spring or well.

The hydraulic ram is manufactured worldwide. Commercial units are simple and easy to maintain and operate but relatively expensive. Owing to its simplicity, a multitude of do-it-yourself ram designs exist for the owner-builder or person with an ability to work with standard plumbing hardware.

Pump evaluation

The two most popular pumps are the deep-well piston pump (hereafter the piston pump) and the submersible centrifugal pump (hereafter the submersible pump) and we will focus on these two. [This is not meant as a judgement against the hydraulic ram. The hydraulic ram needs running water which, over the length of your property, must drop in elevation at least 10 to 15 feet to be useful.]

What factors affect the selection of a piston pump or a centrifugal pump? Let's examine well size, pumping capacity and head, positioning in the well, the power unit, pumping vs usage rates, and energy vs pumping rates.

Well size: A submersible pump is not made for well sizes below 4 inches in diameter. The piston pump can be utilized in well sizes as low as 2 inches.

Pumping capacity and head: The pumping capacity (rate of flow) of the submersible pump decreases rapidly with drawdown, particularly if the water approaches the level of the pump's intake. Effectively, the pumping head is increasing, too, since it's measured from the level of water in the well. This situation may be accommodated in three ways. First, the well can be dug deeper to reduce the effect of drawdown; this also increases in-well storage. Second, a submersible pump with more "stages" and a higher horsepower rating may be selected for the job. And third, a higher-capacity

well—one that won't experience much drawdown—can be dug. In terms of both energy and money, all three are expensive solutions.

A piston pump's efficiency, on the other hand, is not affected by drawdown. Positive displacement always assures the delivery of the same amount of water. So if the pumping head increases because of normal drawdown, the only effect it can have is to increase slightly the load on the above-ground power unit.

Positioning in the well: The submersible pump must at all times be submerged, and a tail pipe will not work with this type of pump. This necessitates a deeper well, both to maintain the pump's clearance above the bottom of the well and to assure that the drawdown will not uncover it.

A piston pump, at the slower pumping rate, causes less drawdown, can pump water from as much as 25 feet below the pump level (using the tail pipe), and requires less clearance above the bottom of the well.

The power unit: The power unit of the submersible pump is limited to an electric motor (gas engines won't run underwater) that is built for 110V or 220V, 60-cycle A.C., single-phase or a variety of DC voltages.

The piston pump can utilize a number of "power" units—muscle power, solar power, wind power, gasoline-engine power, and electrical power. If an electric motor is used, it can be wired for high or low voltage, A.C. or D.C. Additionally, if the pumping equipment cannot be positioned directly over the well, an offset system may be installed.

Pumping versus usage rates: In the "demand" system, the water pump must be closely matched to the rate at which water is used. At the very least, the pump must have a capacity equal to the largest single rate of use. Better yet, it must allow simultaneous rates of water usage. Finding the pumping rate requires thought and consideration.

The store system's pump capacity is not affected by usage rates, singularly or in combination. Instead, it is concerned only with equaling the total quantity of water that is used daily. However, storage must be sized to handle this amount of water, pipes must be sized for the use rates, and the energy source must be selected so that, at whatever rate, the pump will replenish the water. Fortunately, though the water is at times used at high rates, the pump has a 24-hour period in which to restock the water in storage for the next day.

Energy versus pumping rates: It could be argued that for deeper wells, the submersible pump is capable of handling the needs of a "store" system, whereas the piston pump cannot function in the "demand" system. This is a clever observation, yet it's flawed. Why use excessive amount of energy required to do a job quickly when there's normally lots of time to do it slowly. Nevertheless, it brings up an interesting point: There are times when it would be nice to have both pumping rates.

Conclusions: The inherent advantages and disadvantages of the submersible pump and the piston pump are as distinct as the differences between the deep-well systems they commonly serve—that is, the "demand" system and the "store" system, respectively. In a nutshell, we could say that the piston pump works best in situations where only low energy levels are available, high pressure (head) exists, and the water source has a low yield. Conversely, the submersible pump shines in situations where high flow rates are required, low head exists, and energy availability is not an issue. For shallow wells, these differences lessen. The piston pump can approach the highest pumping rate required for the household without suffering the submersible pump's wildly varying pump rates for the same water drawdown.

At this point, it will probably be helpful to look at some examples of commonplace water systems. Three major design concepts are reflected in the Gold, Silver, and Gold-Silver systems. The Gold system is based around the "store" theme of water system design, the Silver system around the "demand" theme, and the Gold-Silver system is a hybrid of the two.

We'll discuss these three water systems next issue in the final installment of this three-part series.

(Some text and drawings in this article were taken from Waterworks: An Owner-Builder Guide to Rural Water Systems (Michael Hackleman, Peace Press, 1983, 172pp), The Homebuilt Wind-Generated Electricity Handbook (Michael Hackleman, Peace Press, 1975, 194pp), and At Home with Alternative Energy (Michael Hackleman, Peace Press, 1980, 146pp) For a publications list, send an SASE to: Michael Hackleman, P.O. Box 327, Willits, CA 95490.) Δ



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A salvaged oak floor for \$5

By Robert L. Williams

Several months ago we decided we did not want to install a traditional bedroom floor of plywood and carpet. We had several reasons, but the major ones were that I am not one of the great fans of plywood floors and that I also dislike most carpeted floors because, with advancing age, I am also advancing in the number of materials to which I am allergic.

We decided to buy oak flooring and install it, but we modified our plans when we visited our building supply store and learned the price of the oak. On the basis of those prices, I figured I could pay off the national debt about as easily as I could buy the flooring.

For the entire work we wanted to do, we would have paid close to \$3,500 for the oak flooring and the nails.

So we modified our stance and decided to take up some old oak flooring in a house near us. The oak, we were told, was ours for the taking. The house was going to be demolished and we could have whatever we wished.

So we set to work, and when we were through we had invested several hours of fairly hard work. But we were able to floor not one but three rooms, and there is still oak remaining, if we can get to it while the old house is still standing.

Here's the bottom line: we removed the old flooring, cleaned and planed it lightly, and re-installed it in the three rooms, all at a total cost of \$5.

Now, if you want to repeat what we did, there are several basic steps, the most obvious of which is to find a house with the flooring you want and can get at a premium price. In our case, we had seen the old house standing empty for several years and it was obvious that the structure was too far

gone to ever be repaired. The owner had made it public that he would cheerfully give anything inside the house to anyone who would remove it and at the same time agree to four basic requests.

First, whoever took materials from the house was asked not to damage other materials so that others could not use them. By this it was understood that if you don't need the paneling, you should not rip it off the walls and ruin it in order to get to what you wanted.

Second, you were to leave the place as clean as possible. That is, you were not expected to leave boards with nails sticking up so that others might be injured.

And you were not to smash windows that you could not raise because they were stuck. You were not to litter the yard or in any way deface the shrubs and flowers that still grew in the area.

Finally, you had to agree that you would not hold the owner legally responsible for any injuries you sustained while you were working on his premises.

Finding a house

If you have not found an ideal house, go looking for one. Ride around the countryside. When you notice a house that is obviously vacant, and has been for months, even years, inquire as to who owns the house, then seek out the owner and ask about giving you his permission to salvage materials.

If you see a sign in front of a house you might want to pause and look closer. If the sign says something like, "Future Home of Podunk Burgers," you know the house will not be used for the new diner and common sense says that the owner might be delighted to have someone take away part, or all, of the house.



To clean off old stains or varnishes, use a planer set so that the blades barely touch the wood.



When the wood is planed, you can coat it with a sealer such as polyurethane stain. Let it dry for several hours, preferably overnight, before you install it.

You might see a church in disrepair, or a civic building, or a school house, or gymnasium. Read newspapers for notices of the demolition of local buildings.

Salvaging

When you have found the house, you will need several pieces of equipment, most notably a pickup truck in which to haul your flooring or other treasures. You will also need a crowbar or prybar, and a hammer with claws.

To take up the flooring, you should remove it exactly opposite from the way it was installed. The flooring is in all probability tongue and groove, which means that only one side of each piece was nailed. The first piece was installed with the groove side against the wall so that the flooring could be nailed through the tongue on the outside edge. All subsequent sections of flooring will have been installed in the same manner.

Your first job is to determine where the flooring started and where it ended. You will start where it ended and work your way back to where it

started, otherwise, you will destroy too much of the valuable oak flooring.

Your first step, particularly in an older house, is to remove the molding, then the baseboards. When the baseboards are out of the way, you can usually see the groove protruding against the wall—or at least close to the wall.

No matter how careful you are, you may have to damage the first section of the flooring. Start by inserting the claws of the crowbar between the wall and the flooring. Let the claws reach into the crack until you get a good leverage point, then raise the other end of the crowbar until the back side of the flooring starts to break free.

Now slip another crowbar into the same basic area, but a foot or two away, and pry gently with both of the crowbars. As you make more and more progress, work your way down the section of flooring until it pops free. If it breaks, you may be able to cut the piece and use it later. Save everything. You don't know when you will need a short piece, especially in the closets or hidden areas.

If there are two or three of you working, let one person start to remove the nails that once held the flooring. Keep a gallon bucket or something similar handy to contain the nails. Most of the time, cut nails are used to install flooring and you can use these same nails when you reinstall the oak sections.

Continue to work your way across the room taking up each piece slowly and carefully. When you have removed two or three rows of flooring, you can see where the pieces are nailed and, if you insert the hammer or crowbar claws near the nails, you can pop the flooring loose easily. If you have trouble getting the crowbar claws under the oak flooring, use a hammer to hit the back of the crowbar and drive the claws under the section.

After removing the nails, stack the flooring, and be sure that none of the sections are under stress. When you haul it to your house, stack it again in



Notice the building paper under the new floor. This paper will keep the floor from squeaking—or it will at least help to do so. When you install each piece of end-matched oak flooring, tap one end gently to get the best possible fit. To keep from damaging the edge of the wood, you can place a scrap piece of oak flooring against the board you just installed, and hammer against that.

a smooth, even manner. Be sure it will be protected from moisture and other damage.

Installing your floor

Before you think of installing the flooring, you may want to sand or plane the wood lightly to remove all old stains or paints applied ages ago. In our case, we own a small portable planer.

I set the planer blades so they barely made contact with the flooring, but deep enough to cut away all of the old stains. It takes only two or three seconds to plane an eight-foot section of flooring and it comes out of the planer looking like new. You can plane enough wood for a full floor within an hour or two.



Use a handsaw when cutting the oak in order to prevent end-splintering.

You may at this point worry about the damage the old stain will do to your planer blades. And you are right. You will dull the blades after an hour or two of work. What then? In my case, I take the blades out, run them on a bench grinder for two seconds, and put them back in.

You could build a case for buying a planer just for the flooring. Even if you spend \$400 for it, when you are finished with the work you still have the planer. We use ours so often, I wonder how we ever did without it.

When you are ready to install the flooring, go over the floor first to be

sure that there are no pieces of debris, no nail heads sticking up, or other problems. You may want to put down a layer of building paper before you start installing flooring. It is useful in preventing squeaky boards. Lay a strip of paper and start putting down flooring. Don't cover the entire floor with building paper; if you do, you will rip and tear it to shreds before you finish the room. Lay the paper as you go.

It is a good idea to place a square in the corners of the new room just to be certain that your corners are square. If they are not, you will need to make

adjustments somewhere. More about that later.

Start by pushing the first section of flooring against the wall, the groove side toward the wall. See if the section fits flush against the wall. If the old flooring is bowed or warped, you may need to set it aside and try another. You may as well get off to a good start.

When you find a good length of flooring, drive the cut nails into the tongue. Hold the nail so that it is at about a 45° angle to the tongue and the top surface of the oak. If the oak is extremely old, you may need to drill a small pilot hole to keep from splitting the tongue. You can even use the holes that are already in the oak. Try them to see if they work well and offer a good hold.

When the nail head is close to the wood, stop hammering and use a punch to sink the nail the rest of the way. One easy way is to lay the punch across the top of the nail head, then strike the side of the punch with the hammer until the head of the nail is flush with the surface of the wood at the tongue.

You will find that much older oak flooring is end-matched, which means that you can fit the ends together as if they were pieces in a jigsaw puzzle. The two ends join neatly, perfectly, and soundly.

It is a good idea to lay all of the sections in stacks that are of similar lengths. We used masking tape with marks on each section to indicate length. By using the lengths wisely, you can cut waste down to a minimum.

Use the best pieces where they will show off the room to the best advantage. Save the less attractive wood for closets or other spaces that will not be seen readily. However, most of the wood will be of high quality and this selection process will not be a problem.

Do not let sections end at the same place. If your room is 18 feet across and if you have flooring lengths of 8



Fitting the oak flooring across a door opening requires patience and care.



Some sections of flooring will have warped, no matter how very careful you have been. When you encounter pieces such as the one shown here, you can nail a pry block near the wood and use a crowbar to pry the wood into a good fit then nail it while it is in its exact position.

and 10 feet, the simple thing to do is use the 10-foot section first in one course of flooring and the 8-foot section next. On the next course start with the 8-foot section and finish with the 10-foot section. If you have or must use short lengths, try to keep these for use at the ends rather than in the middle of the room.

When you come to a length of flooring that is hopelessly bowed, but you need it anyhow, you can align it by doing the following. Lay the section in position. If it fits well at any point, nail it at that point. Where the bow starts, move out a few inches and nail a short piece of 2 x 4 to the plywood floor. Next, place another short length of 2 x 4 against the floor and also against the flooring. Then put the tip of the crowbar between the two blocks of wood and pry against the flooring until the flooring fits snugly. Hold the flooring in position while you drive two or three nails to be sure it stays in place. You can straighten out a four- or five-inch bow this way. Even if the fit is nearly perfect, keep prying until the fit is exact.

Do not use the crowbar against the oak flooring itself. You will mar the surface of the wood.

When you reach the end of a course, measure the length of the remaining distance then cut your final section

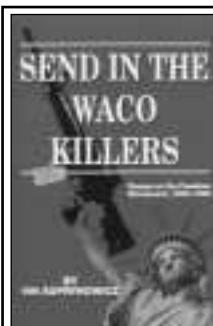
slightly shorter than the needed length. Many home-repair people try for an exact fit. But why? You will cover the slight crack with molding or baseboard.

When you come to the end of the room, you may need to rip a length of flooring by using a circular saw. Here, again, do not try for an exact fit. When the piece is cut, tilt it slightly so the groove starts over the tongue. You may need to lay a piece of scrap wood over the final flooring and hit the scrap wood with a hammer to drive the final piece into place.

If you have an especially difficult fit, you may want to turn the flooring over and cut or chip off the bottom side of the groove so that the flooring fits easily into place.

Your final (and optional) job is to apply a coat or two of polyurethane sealer and protector onto the oak. If you don't want to do this, the floor will remain shiny and bright for months to come. On the other hand, if you want to put a dozen coats onto the wood, no harm is done and you have more and more protection.

I lied. The final job is to stand in the doorway and look at the shiny floor and think of how little it cost to have such a beautiful oak floor. △



SEND IN THE WACO KILLERS

Three times the International Society of Newspaper Editors has included Vin Suprynowicz in their list of the 12 top weekly editorial writers in North America. For years his shoot-from-the-hip style has opened the eyes of thousands to government abuse of our liberties. In this book, Send in the Waco Killers, he blends material taken from his syndicated column with new commentary to give the reader a detailed, reporter's-eye-view of how the rights and freedoms of Americans are being subverted.

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